Decoding Names, Decoding Bias: Unravelling Gender Perception through Toponymy in Italy

Baggetta C. ‡* Cerruti G.*§* Santagata M.*.

Abstract

Streets names reflect the commemorative decisions of a community since they represent not only the historical and political causes of naming and renaming process that a city experiences, but also social and cultural values. Since history is written by winners, minorities are usually underrepresented in commemorative streets names. Women surely do not constitute a minority, but they are historically excluded from the public sphere and, consequently, they do not frequently appear in street names. This study, exploiting street names as source of cultural data, aims to analyse individual perception towards gender equality through urban toponymy in Italian municipalities. Specifically, different specifications of a Probit model are estimated to observe how a change in the ratio of streets named after women is related to the probability of an individual to have a more equitable gender perception. Results show that, even when controlling for a complete set of geographic, socio economic and historical controls, in the Italian municipalities with a higher percentage of streets named after female, there is more awareness about gender bias and a greater attitudes towards gender equality.

Keywords: gender equality; streets names; toponymy; cities; cultural values.

JEL Classification: J10, J16, R58, O18, O10, R10.

*Corresponding author. *E-mail address:* gianluca.cerruti@unige.it, * University of Genova

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1 Introduction

Overtime, the use of street names has seen an evolution of its interpretation. Even if urban toponymy associated with important public figures has existed since the ancient times, street names began to undertake political purposes after the French Revolution. Modern political culture utilizes street names for commemorative aims and street names have a crucial role in building a shared past, beyond their primary function of spatial organizations of the cityscape (Azaryahu, 1996). This issue has attracted the attention of researchers and an important strand of literature has focused on the historical and political causes of streets' naming and renaming process (Faraco and Murphy, 1997; Palonen, 2008; Tretter, 2011; Tucci et al., 2011; Drozdzewski, 2014; Rusu, 2020; Fabiszak et al., 2021; Alvanides et al., 2021). It can be argued that nowadays street names represent social, cultural and political heritage (e.g., among others, Rose-Redwood et al., 2010), and different authors have analysed the relation between street naming and social and cultural values, i.e. national identity (Oto-Peralías, 2017), religiosity (Oto-Peralías, 2018), and male predominance (McDowell, 2008; Bigon and Zuvalinyenga, 2021; Yu, 2014; Gutiérrez-Mora and Oto-Peralías, 2022). As far as the latter issue is concerned, it is worth recalling that street names have a strong symbolic importance and the lack of specific categories' representation in street naming sounds like a synonym for social exclusion: it is not particular surprising that minorities are underrepresented in commemorative street names since the latter express the predominant socio-political order (Gutiérrez-Mora and Oto-Peralías, 2022). This study aims at contributing to this last strand of literature by analysing the relation between the individual perception towards gender equality and the share of streets named after female in their municipality of residence. Indeed, even though women surely do not constitute a minority, they are historically categorized as a marginalized group and are underrepresented in the public sphere. Therefore, the analysis of gender bias in place naming could lead to some interesting considerations on the role of women in our society.

Following Oto-Peralías (2018) and Gutiérrez-Mora and Oto-Peralías (2022), this study adopts text-analysis to scrutinize urban toponymy at municipal level in Italy and regression analysis to investigate the relation between gender equality perceptions and the ratio of streets named after women. Indeed, in Italy the naming of public places and traffic areas is attributed by law to the municipal council and, as a consequence, we truly believe that considering toponymy can be a key element in understanding a population's attitude towards gender equality.[1] Furthermore, the Italian case is emblematic and data about streets named after female are striking since, among the 21 regional capitals, only 6.6% of streets is named after women.[2]

[1] Law n. 118 of 13 June 1927 and Circular No. 18 of 29 September 1992.

[2] In the Italian administrative setting, provinces are NUTS-3 regions, while NUTS-2 regions are called regions. From now on we use these terms interchangeably.

To conduct the analysis, we focus on the individual perception towards gender equality of young Italians in 2017 by exploiting the richness of information contained in *Rapporto Giovani*, a database that provides yearly survey data from thousands of young Italians (i.e. 3,034 individuals between 18 and 34 years).[3] Unlike Gutiérrez-Mora and Oto-Peralías (2022), which exploit regional-level data, this study uses an individual-level survey, which allows us to obtain greater granularity.

Furthermore, to calculate the number of females' named streets over the total number of streets in each municipality we exploit information contained in the Italian Permanent Census of Population and Housing.

In this study we estimate different specifications of a Probit model where the individual perception towards gender equality is regressed on the ratio of streets named after women, and a complete set of control variables. Results show that one unit change in the measure of female streets (%) increases the probability of having a more equitable gender perception by 1.3-1.6%. Furthermore, to validate the results, the analysis is replicated both by using an alternative dependent variable and by calculating the main explanatory variable with a different metric, i.e. we transform it into a dummy variable. Comfortingly, our results still hold. As far as the external validity of our results is concerned, we argue that young people represent the part of population which mostly use social networks, undoubtedly a mean to decontextualize from the cultural setting, and if the relation between the number of streets named after female and a positive perception of gender equality holds in our sample, this result can be easily extended to the entire population.

Overall, our findings highlight a robust correlation between the dependent variable and our main explanatory variable, suggesting that street names reflect the social and cultural values of citizens. However, in the absence of a natural experiment, there is no a smoking gun evidence that a higher number of streets named after women influences women's perceptions and reverse causality concerns may arise. While we assume that street names can shape values and cultural traits, it can also be argued that the opposite happens. Indeed, as previously mentioned, in Italy, the naming of public places and traffic areas is the responsibility of the municipal council: therefore, the cultural attitudes of citizens are reflected, at least in part, in the street names chosen by their political representatives. In addition to this, there may be problems related to omitted variables bias. On the one hand, the stability of the coefficients in the different specifications (Altonji et al., 2005) and the results obtained from the Oster test (Oster, 2019) may alleviate the second concern. On the other hand, we conduct a heterogeneous effects analysis, which corroborates the mechanism we propose, thereby mitigating the first concern to some extent. In particular, by dividing the sample according to certain individual and territory features,

[3]Promoted by the Istituto di Studi Superiori Giuseppe Toniolo and carried out by IPSOS, it is the most in-depth and extensive survey on youth in the last decade in Italy.

it turns out that the relation between the percentage of streets named after women and a more equitable gender perception is more evident for not-educated individuals as well as for individuals with not graduated parents. Accordingly, results suggest that the correlation between gender perception and female street names is particularly large in magnitude when considering internal areas and smaller towns.

To the best of our knowledge, this study is the first to empirically investigate the relation between toponymy and socio-cultural values in Italy. Indeed, this relation has been tested in a limited set of countries, e.g. Spain (Oto-Peralías, 2018; Gutiérrez-Mora and Oto-Peralías, 2022), Great Britain (Oto-Peralías, 2017), United Stated (Tretter, 2011). In particular, we focus on a specific aspect of cultural and social values, i.e. gender perception, an issue relatively less studied by researchers. The only notable exception is Gutiérrez-Mora and Oto-Peralías (2022), where this relation is put under scrutiny in Spain, and so we believe that our study brings the valuable contribution of verifying the external validity of results found in other countries.

The rest of the paper is organized as follows. In Section 2, related literature is scrutinized. In Section 3, the Italian context is depicted. Data and identification strategy are described in Section 4. Then, in Section 5, results are illustrated and, finally, Section 6 concludes.

2 Related Literature

This paper can be ascribed within the strand of literature that examines the political process and commemorative dimension involved in the naming of specific cityscapes, i.e., place naming (Giraut and Houssay-Holzschuch, 2016)[4]. In this study, the analysis of place naming is approached by examining street names through socio-economic dimensions, with a specific emphasis on the gender gap.

The literature surrounding the analysis of place naming is extensive as "the naming process shed light on power relations - how some social groups have the authority to name while others do not – and the selective way in which such relations reproduce the dominance of certain ideologies and identities over others" (Rose-Redwood et al. 2010, p. 462). In particular, Azaryahu (1996) emphasizes how contemporary political culture employs street names for commemorative purposes and examines the typical procedures involved in naming and renaming streets. Ultimately, he concludes that the naming and renaming of streets reflect the diverse narratives intertwined in the construction of social reality. This rationale is echoed in the widespread practice of renaming streets in response to political changes. Various studies conducted

[4]Giraut and Houssay-Holzschuch (2016) carry out an important distinction between the analysis of street names and the analysis of place naming. In the former case, studies mainly focus on the etymology and its origin. In the latter, studies focus on the processes and stakes involved in naming a particular place.

by social scientists across different European countries have explored this hypothesis to varying degrees. For instance, an interesting work by Faraco and Murphy (1997) sheds light on how political regimes in Spain manipulate toponymy according to their ideological values, thereby altering the dynamics between institutions and residents. During the Second Republic, street names were utilized to promote educational agendas. Subsequently, the military dictatorship of Franco employed toponymy to enforce fascist symbolism. Finally, the socialist democracy sought to eliminate the onomastics of vanquishers and losers. In the same vein, the work of Palonen (2008) examines the evolution of street names in Budapest from 1985 to 2001. The author underscores that these changes do not simply signify a transition toward a unified post-communist value system. Instead, they reflect divergent political trajectories at various administrative levels, including the nation-state, municipalities, and districts. Additionally, Drozdzewski (2014) investigates the transformation of street names in Krakow during different political regimes (Nazi, Soviet, and Polish) across five distinct periods (1934, 1943, 1964, 1985, and 1996). The author illustrates how each occupying power interprets its rule, and demonstrates how all three governments manipulate street names to assert political control, reinforce historical precedents, and assert cultural dominance in the urban landscape.

Building on the earlier mentioned research, recent studies have increasingly adopted a quantitative approach to examine the evolution of commemorative street names. For instance, Rusu (2020) explores post-socialist place naming in three Romanian cities (Brasov, Cluj-Napoca, and Sibiu) using a logistic regression model to assess the factors contributing to toponymic transformations. The findings reveal that both the features of street names (such as politicized designations directly linked to the socialist regime) and topographic characteristics (including geographical location and size) play significant roles in determining the street renaming process following the collapse of socialism. Furthermore, Alvanides et al. (2021) offer a longitudinal examination of street names in Leipzig spanning 102 years (1916-2018). Employing GIS visualization techniques, they observe that a significant proportion of name changes coincide with regime transitions. Lastly, Fabiszak et al. (2021) endeavor to differentiate between ideological and non-ideological street renaming processes through a systematic encoding of street renaming practices in two cities (one in Germany and the other in Poland). Their analysis highlights how varying interpretations of what constitutes ideological renaming can shape the urban landscape.

As far as Italy is concerned, the existing literature includes only one case study focused solely on a single town, Milan, rather than the entire country. Tucci et al. (2011) employ GIS methodology to analyze street names in Milan's city center. Their research objective is to reconstruct the various historical narratives and ideologies that coexist within the urban landscape over time. They propose a valuable tool, a visual representation of street networks, to achieve this goal.

As mentioned before, street names represent not only political heritage but also cultural and social values. For instance, Oto-Peralías (2018) utilizes street names as a cultural data source for quantitative analysis in Spain. He specifically examines an indicator of religiosity—namely, the prevalence of religiously named streets—and discovers a strong correlation with a cultural factor reflecting the population's religious beliefs, as well as a negative correlation with local economic development. As already observed in Oto-Peralías (2017), similar correlations have been identified in various countries. For instance, in Scotland, residents of streets commemorating Great Britain are less inclined to exclusively identify with Scottish cultural values.
Given the profound symbolic significance of street names, the absence of specific categories' representation sounds like a synonym for social exclusion. As Berg and Kearns (1996) note, "naming is a form of norming", indicating that place names are often determined by hegemonic groups who impose their social norms. In Otago, New Zealand, for example, place names reflect masculinist colonialism and colonial history, serving as a legitimization of hegemonic arguments related to gender, race, and class. Similarly, Tretter (2011)underscores how commemorative place-naming mirrors social patterns. The researcher highlights the disparity between white and African-American commemorative figures, noting that "black commemoration" remains a "black thing". This disparity signifies that these important figures serve as symbols for only a portion of the sociocultural geography of the United States, revealing the ongoing limits of social inclusion within contemporary societies.
As Gutiérrez-Mora and Oto-Peralías (2022) note, it is not surprising that minorities are underrepresented in commemorative street names, as these names typically reflect the prevailing socio-political order. While women do not constitute a minority in terms of population, they have historically been marginalized and are underrepresented in the public sphere. For instance, McDowell (2008) examines commemorative street names following the Troubles in Northern Ireland and finds that, despite the significant role women played in the conflict, men predominantly shape commemoration choices and prioritize male narratives, often omitting the contributions of women participants. A similar pattern is evident in South Africa, as noted by Forrest (2018), who investigates the street renaming process in Durban. Forrest highlights the failure of post-colonial and post-apartheid efforts to rebalance women's representation in power dynamics, indicating that male narratives continue to dominate the commemorative landscape.
As Gutiérrez-Mora and Oto-Peralías (2022) emphasize, the primary factors contributing to gender bias in street naming are the lack of women in decision-making roles and the persistence of a patriarchal culture. Their study serves two main objectives: first, they employ text analysis to quantify the gender gap in Spanish cities and construct a composite indicator to assess the percentage of streets named after women relative to the total number of streets with male and female names. Subsequently,

they investigate the correlation between this composite indicator and variables related to gender values and attitudes. Their findings indicate that street names can serve as a valuable tool for measuring gender bias at the city level. Furthermore, they note that although the proportion of streets named after women is increasing, it still lags far behind parity. In addition, Bigon and Zuvalinyenga (2021) underscore how the predominance of male names in place naming reinforces the notion that male names are the norm in the public sphere. Focusing on cities in Sub-Saharan Africa, they demonstrate how the exclusion of women from urban spaces impacts their political experiences and well-being. In the existing literature, many studies on street names and gender gaps concentrate on specific case studies. For example, Yu (2014) explore the gendered nature of space within the city of Anping in Taiwan. Through interviews with stakeholders, they find that the prevalence of male names in streets contributes to the perpetuation of gender stereotypes and reinforces patriarchal perceptions of women in society.

This study contributes to the literature on place naming as a reflection of cultural and social values by examining the relationship between young Italians' perceptions of gender equality and the proportion of streets named after women in their municipality of residence. Using a quantitative approach based on probit estimation, we investigate this relationship, aiming to validate the external validity of findings from other contexts. Importantly, our study focuses on a more challenging sample of young adults aged 20-35. Therefore, if our results confirm the existence of a relationship in this sample, it would further underscore the significance of toponymy in illustrating the enduring influence of culture and values.

3 Understanding toponymy: the Italian context

According to Mask (2020) "street names are places of memory, they hand down the past in public space". Zucchi (2023) emphasises the difference between toponymy and odonymy. The former refers to places: it includes, therefore, city names, regions and geographical specifications, and is more difficult to change over time (e.g. Via Trieste, Via Trento). The latter can be seen as a subcategory of toponymy and refers to the naming of streets, thus being more subject to change as it follows social changes and historical events.

The use of odonymy for commemorative aims has an important social function as it identifies citizens' residences for tax and registry purposes. In Italy, the use of street names for commemorative purposes is recent. In fact, with the Unification of Italy, it became necessary to create common values in which the newly-born Italian people could recognize themselves. As Gentile (2014) suggests, toponymy takes on a function of civil pedagogy and is part of the so-called "*civil religion*" of enlightenment matrix. The author claims that "this term is used to define a system, more or less

elaborate, of beliefs, myths, rites and symbols, which confers a sacred character to an entity of this world, making it the object of worship, devotion and dedication".
Initially, odonymy was unrelated to political events, but it made use of territorial peculiarities, places of worship or dialectal expressions, e.g. "*calle*" in Venice, (Ihl, 2005). With the advent of post-unification politics, the objective of the so-called historical left (i.e. the political movement that took over power in the last quarter of the 19^{th} century) is to "*make the Italians*" (Banti, 2013). Thus, a process of naming streets after the *patres patriae* (Cavour, Mazzini, Garibaldi, Vittorio Emanuele) who helped create the Italian state began.
After the end of the liberal era, fascism recognized the potential of utilizing odonymy for propaganda purposes to garner public support. During the fascist regime, references to ancient Rome, the First World War, and colonial endeavors became increasingly prevalent in the street names of Italian cities. The law that currently governs odonymy in Italy traces back to the fascist era, specifically Law No. 118 of June 13, 1927. This legislation provides guidelines for the introduction or alteration of street names. Following the collapse of the fascist regime, there was a restoration process for the previous names in odonymy. Since the 1960s, new street names have been dedicated to concepts such as the Constitution, Republic, and Peace (Ridolfi, 2017; Ravveduto, 2018).
Currently, the responsibility for naming public places and traffic areas lies with the municipal council. According to Circular No. 18 issued on September 29, 1992, prefects are empowered to authorize the naming of public places after individuals who have passed away within the last ten years. However, this authorization is contingent upon the municipal administration providing documentation justifying the choice, along with the curriculum vitae of the person to be honored. This procedure unequivocally demonstrates the level of respect and closeness the community wishes to express towards its most esteemed citizens. Conversely, if there is a desire to change a name, the superintendency assesses the appropriateness of the proposed change (Vitolo, 2021).
In the processes of naming and renaming public places, there is a noticeable lack of representation of female figures. This trend can be attributed to cultural factors that have historically marginalized women in the public sphere, despite their significant contributions. It is evident that prominent female figures are vastly underrepresented in cities. In the Italian context, this issue is particularly pronounced. Data on streets named after women underscore this disparity: among the 21 regional capitals in Italy, only 6.6% of streets bear female names. Excluding saints and blessed individuals, this figure drops to 3.9%[5]. This data highlights a significant gender gap in street names, indicating a need for greater recognition of women's contributions to society. Awareness of this gender disparity has spurred various initiatives, includ-

[5]Data source: https://italy.mappingdiversity.eu

ing the Toponomastica Femminile association[6].This organization has meticulously mapped the streets of all Italian municipalities, effectively highlighting the substantial gap between streets named after men and those named after women. Recently, semi-automatic methodologies have also been developed (Zucchi, 2021) which utilize QGIS technology to map the odonymic landscape at a national level. For instance, by analyzing the top 100 most common names in 107 medium-sized cities (with populations ranging between 20 and 50 thousand inhabitants), it was found that the first women's names appeared in the 94^{th} and 100^{th} positions, namely Santa Lucia and Grazia Deledda (Nobel Prize winner for literature in 1926), respectively. This serves as evidence of a growing focus on women's toponymy, prompting various relevant initiatives within Italy. One notable example is the administration of Naples[7], which has implemented a policy requiring the naming of one street after a man and one after a woman. Similarly, in the municipality of Barberino Tavernelle[8], the local administration has suggested eliminating the practice of double naming streets and instead replacing them with names of female figures proposed by the citizens themselves.

For the sake of simplicity, the term "toponymy" will be used interchangeably with "odonymy" throughout the paper.

4 Data and Identification Strategy

4.1 Data

This study relies mainly on the combination of two databases: "*Osservatorio Giovani*" survey by IPSOS and "*Censimento della popolazione e delle abitazioni*" by ISTAT. The "*Osservatorio Giovani*" survey, provided by IPSOS for the Giuseppe Toniolo Institute of Higher Education, consists of national individual-level survey covering various themes. The survey aims to offer a comprehensive understanding of Italian youth and their perceptions of societal changes. For this study, data from the year 2017 is utilized, with a sample size of 3,034 individuals aged 20 to 35. This dataset provides unique information at the individual level, including respondents' answers on a wide range of topics as well as standard demographic characteristics such as age, education, marital status, and gender. In addition to the IPSOS data, this analysis utilizes data on geographical, historical, and socio-economic characteristics at the municipal level, primarily collected by ISTAT through the "*Censimento della popolazione e delle abitazioni*" and the "*Atlante Statistico dei Comuni*". The next sub-paragraphs

[6]For further details, see: https://www.toponomasticafemminile.com

[7]Source: Comune di Napoli, *Regolamento comunale per la toponomastica e la numerazione civica*, 22 February 2021.

[8]Source: Ufficio stampa associato del Chianti fiorentino, *Venti donne per venti strade 'doppie' da rinominare a Barberino Tavernelle*, in "Go news" 13 March 2021.

will delve deeper into the specific sources and variables utilized in this study.

Gender equality perception

Starting from the questionnaire "*Osservatorio Giovani*", a dummy variable is built to describe individuals' perceptions of gender. The dependent variable for the analysis is a dummy variable named *WomenLeader*, based on respondents' personal judgments regarding the statement: "In general, men are better political leaders than women." Similarly, the other outcome considered for robustness checks is called *WomenManager*, where respondents express their opinions on the statement: "In general, men are better managers than women." For each statement, respondents select an answer ranging from "*Completely disagree*" to "*Totally agree*". If the response to the claim is "Completely disagree," the values are coded as 1; otherwise, they are coded as 0. The choice of the main outcome variable (*WomenLeader*) is motivated by the persistent male dominance in Italian politics, despite recent appearances of female leaders at the helm of the country's major political parties[9]. Regarding the alternative outcome (*WomenManager*), the data paint an even more dismal picture: as of 2021, only 3% of chief executive officers (CEOs) in Italy are women, a decrease from 4% in 2020.[10].

Female street names

The "*Censimento della popolazione e delle abitazioni*" dataset provided by ISTAT contains records of all streets in Italy, each with a unique code for roads in every municipality. To begin with, we explored this extensive dataset, which comprises approximately 21 million observations. Initially, we tallied the number of streets in each municipality. Subsequently, we extracted and counted streets named after women in each municipality. For this purpose, we considered the first thousand female names listed as the most common female street names.[11]. The findings reveal a stark reality: only 6.6% of streets in Italy are named after females. Among the 21 regional capitals in Italy, Bolzano leads the ranking with 13% of streets named after women, while Aosta lags behind with only two streets honoring female figures out of a total of 73 streets dedicated to individuals. The process of extracting streets named after female figures involved several crucial steps. Initially, textual analysis was conducted to precisely search for names (and, if applicable, family names) in the initial list. Subsequently, the search was expanded to include even partial

[9] *Inter-Parliament Union* (IPU) reports that in 2023 in Italy 35.7% of parliament are women. For further details, see: https://www.ipu.org/parliament/IT

[10] Data are taken from the European Women on Boards Gender Diversity Index (2021). For further details, see: https://europeanwomenonboards.eu/wp-content/uploads/2022/01/2021-Gender-Diversity-Index.pdf

[11] Precisely, 918 female names are selected considering the Italian 21 regional capitals. These names are taken from https://italy.mappingdiversity.eu/. The list of the first 50 most used names is provided in Appendix, while full list of name used in this analysis is available upon request.

matches of the initial name (e.g., only the first name). While this second step enabled the identification of a larger number of streets, it also introduced potential distortions. Hence, following an initial automated selection, the extracted names underwent manual analysis. For instance, some streets may contain names that are challenging to categorize, either because a particular name is used for both male and female individuals (e.g., "Andrea") or due to combinations of one female and one male name (e.g., "Filippo Maria").

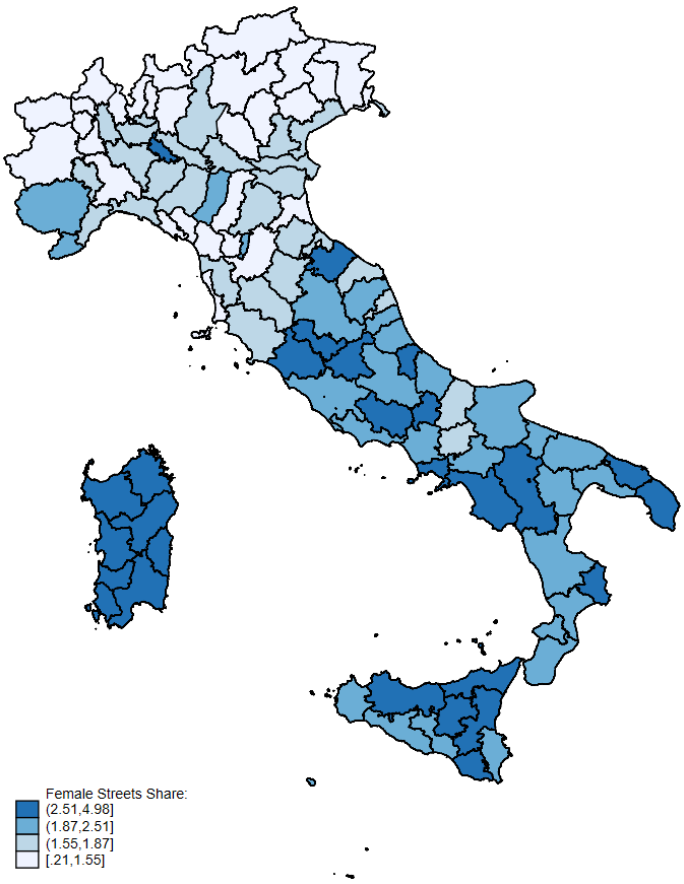
Finally, a street-name indicator of female share is identified:

$$FS_m = F_m/(M_m + F_m)x100 \tag{1}$$

Where M_m and F_m capture the number of streets in the municipality m including names which refer to men and women, respectively. The variable is called *Female Streets*.

Figure 1 reports the intensity of share of female streets at NUTS-3 level in Italy. Here, colour blends from light to dark blue according to the number of streets named female for each NUTS-3 region. It is pointed out that in the islands (e.g. Sardegna and Sicilia) and in South Italy is concentrated the majority of street entitled to women.

Figure 1: Female streets share at NUTS-3 level



Other variables

In this study, several sets of control variables are taken into consideration. Firstly, we collected data on individual-level variables related to age, educational attainment, marital status, religious beliefs and gender. One specific individual-level control variable constructed is a dummy variable indicating religiosity. This variable takes the value 0 if the respondent is religious, meaning they attend church weekly, monthly, or at least sometimes in a year, and 1 otherwise, indicating they never go to church or attend only on rare occasions. Controlling for religion is deemed relevant due to the significant presence of the Catholic Church in Italy, which historically fosters patriarchal cultural norms (Attoh, 2017; Casanova, 2009). Secondly, a group of variables includes geographic controls. More specifically, to account for the possibility that attitudes towards gender equality may be weaker in more remote areas, a dummy variable is included. This variable is coded as 1 if the municipality is considered an urban center and 0 otherwise. [12]. In the same spirit, we include in the set of geographic controls an index of terrain asperity of each municipality [13]. As a proxy for accessibility, distance from the sea is considered. Seaside towns historically have been recognized as hubs of cultural exchange and may have more open-minded inhabitants(Abulafia, 2011; Braudel, 1995). Therefore, the geodetic distance between each municipality's centroid and the nearest point on the Italian coastline is calculated and included as a control variable. Furthermore, variables related to the socioeconomic context of individuals' municipality of residence are included in the analysis. To capture different levels of economic development, the growth rate of population between 2001 and 2017 and the average municipal income are considered. These data are sourced from ISTAT's "*Atlante Statistico dei Comuni*". Furthermore, we control for the resident population in 2017 because it is hypothesized that in larger cities, individuals are more likely to be aware of streets named after women, even if the number of such streets is the same. In the same spirit, we control for historical size of city, exploiting data from Guiso et al. (2016). Specifically, a dummy variable is created based on the size of cities in the 1300s: it takes the value 1 if the population in 1300 exceeded 10,000 people, and 0 otherwise[14]. Regarding the productive structure, the analysis considers the number of local manufacturing firms operating in Italy in 2017. This variable provides insight into the industrial activity within each municipality. Additionally, data on the number of people without high-speed internet connection, sourced from Schaub and Morisi (2020), are included. This variable serves as a proxy for access to modern technology and infrastructure, which may influence individuals' attitudes and perceptions. [15]. It is noteworthy that

[12]This variable is created starting from data provided by Schaub and Morisi (2020).

[13]The index of terrain asperity is calculated starting from Nunn and Puga (2012).

[14]Information on city size are taken from Bairoch et al. (1988), who report the population of European cities between 800 and 1850, approximately every 100 years. Although there are population data referring to earlier periods, 1300 is the first year in which there are only few missing data.

[15]Data available in Schaub and Morisi (2020)'s Online Appendix. The data are provided for the

internet use is a powerful tool in transmitting values overtime and across generations. Furthermore, this analysis includes police expenditure as a proportion of total expenditure to capture the emphasis each municipality places on social security[16]. Additionally, social capital is accounted for by utilizing data on the number of non-profit associations at the municipal level in 2001, weighted by resident population. This variable serves as a proxy for the strength of social connections and community engagement within each municipality (Collischon and Eberl, 2021)[17]. Finally, we introduce a control variable which is constructed based on the birthplaces of the women who contributed to writing the Constitution, often referred to as "*Founding Mothers*". It is reasonable to assume that individuals living in or near a municipality that is the birthplace of such prominent figures in Italian politics may be influenced, at least partially, in their perceptions of gender equality. We collected information on the birthplace of each "founding mother" and we computed a matrix of distances between the latter and each municipality's centroid. From this matrix, we constructed a dummy variable that assumes value 1 if the municipality is within 20 km to the founding mothers' birthplace, and 0 otherwise.

To conclude, we report in Table 1 descriptive statistics of all the variables described above. Since in this study we use data at both individual and municipality level, variables are divided in *Individual level variables* and *Municipal Level Variables*.

years ranging from 2012 to 2015, while in this study we refer to the year 2015.

[16]Data available in Bove et al. (2023).

[17]Data related to measures of social capital for Italian provinces and municipalities are available at Tommaso Nannicini's personal website: https://www.tommasonannicini.eu/it/works/measures-social-capital-italian-provinces-and-muni/.

Table 1: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Individual Level Variables					
Age	2,888	29.216	4.167	20	35
Educational Attainment	2,888	2.587	.728	1	4
Marital Status	2,888	1.277	.485	1	5
Gender (Male=1 Female=0)	2,888	1.635	.482	1	2
Religiosity	2,888	.576	.494	0	1
WomenLeader	2,888	.856	.351	0	1
WomenManager	2,888	.854	.353	0	1
Municipal Level Variables					
Population Growth (lnPop2017-lnPop2001)	1,213	.07	.125	-.509	.703
Income Per Capita	1,213	1321296.2	379349.76	457040.63	3595310.5
Manufacturing Firms	1,213	182.982	498.172	1	9339
Broadband Coverage	1,213	.01	.018	0	.267
Police spending (per capita)	1,213	35.93	21.77	0	254.434
Ruggedness	1,213	1.317	1.579	0	8.667
Urban Area (Urban=1 Rural=0)	1,213	209.723	.448	209	210
Distance from the Sea (within 20km=1 otherwise=0)	1,213	.383	.486	0	1
Medieval Large city (Yes=1 No=0)	1,213	.035	.185	0	1
Non Profit Association (per capita)	1,213	.004	.002	0	.018
Near birthplace of a "founding mother" (within 20km=1 otherwise=0)	1,213	.093	.291	0	1
Share of Female Street Name over total (Female Streets)	1,213	2.179	1.801	0	21.25

Sample: young adults aged 20-35 in 2017.

4.2 Identification Strategy

The main analysis of this study relies on multivariate standard probit regressions that are used to assess how and to what extent the percentage of female street names in a municipality is related to individuals' gender equality perception[18]. We are interested in how the probability of having a more egalitarian perception of women's role in society changes based on the proportion of streets named after females. The Probit model to which we refer can be expressed as follows:

$$\begin{aligned} &Pr(WomenLeader_{i,m,r} = 1 \mid FemaleStreets_m, Z_m, X_{i,m}, \mu_r) \\ &= \phi(\alpha + \beta FemaleStreets_m + \gamma X_{i,m} + \sigma Z_m + \mu_r) \end{aligned} \tag{2}$$

where the dependent variable, $WomenLeader_{i,m,r}$, is the binary perception towards gender equality attitudes for individual i in municipality m and region r, specifically towards female figures as political leaders, and Φ is the standard normal distribution function. The dependent variable assumes value 1 if individuals do not believe that men are better political leader than women, while it assumes value 0 otherwise. The key explanatory variable is $FemaleStreets_m$ and represents the percentage of streets

[18]The standard probit is based on the assumption that random errors are normally distributed with zero mean and unit variance. This means that the analysis is based on the standard cumulative normal distribution function, which was used to model the relationship between the binary response variable and the explanatory variables. In the case of the probit model, the identification strategy is based on maximising the model's likelihood function, which describes the probability of observing the data given the model parameters.

named after women in municipality m. The sign of the β coefficient associated to this variable indicates if an increase in $FemaleStreets_m$ is related to an increase or a decrease in the probability of $WomenLeader_{i,m,r}$=1. $X_{i,m}$ is the vector of personal controls at the individual level (age, gender, educational attainment, marital status, religiosity), while Z_m is the vector of controls at the municipal level and it entails geographical, socio-economic, social capital, historical and political controls[19]. Finally, μ_r represents regional fixed effects: while we generally refer to NUTS-3 regional fixed effects, in some specifications we also refer to 20 binary variables, one for each Italian NUTS-2 region.

5 Results

5.1 Main results

In this section, we present the main results obtained from estimating the probit model outlined in Equation 2. Table 2 displays various model specifications, which vary according to the inclusion of different set of controls and the regional fixed effects[20]. It is worth noting that Table 2 shows the marginal effects of a unit increase in the variable $FemaleStreets_m$ on our dependent variable, $WomenLeader_{i,m,r}$. Specifically, the first column presents estimates of the baseline specification, where only NUTS-3 regional fixed effects are considered. In the subsequent columns, different sets of controls are progressively added, yet the marginal effects remain significant across all specifications. Column (2) incorporates personal and geographical controls into the model. In Columns (3) and (4), socio-economic and social capital controls are added, respectively. Column (5) introduces controls for historical variables, while Column (6) includes a political control. Across all specifications, the positive sign of the marginal effect indicates that a higher presence of female-named streets increases the probability of having a positive attitude towards gender equality[21]. Overall, the results suggest that a one-unit change in the percentage of streets named after women increases the probability of having a more equitable gender perception by 1.3-1.6%. Lastly, it is noteworthy that in all specifications reported in Table 2, standard errors are clustered at the NUTS-3 level. What is particularly significant to emphasize is the stability of the results across all specifications.

[19] An in-depth explanation of all variables is provided in Section 4.1.

[20] We re-estimate the most comprehensive specification with NUTS-2 regional fixed-effects instead of NUTS-3 regional fixed-effects. Also in this specification, the marginal effect of an increase in the percentage of streets named after women is positive and significant.

[21] The discrepancy in the number of observations is attributable to computational considerations related to the estimation of the Probit model, whereby the number of observations deleted in the process varies based on collinearities detected by the algorithm.

Table 2: Main Results

Dependent Variable:	$\text{WomenLeader}_{i,m,r}$				
	(1)	(2)	(3)	(4)	(5)
FemaleStreets_m	0.0143**	0.0133*	0.0157*	0.0160**	0.0158*
	(0.00714)	(0.00703)	(0.00804)	(0.00812)	(0.00814)
NUTS-3 FE	X	X	X	X	X
Personal		X	X	X	X
Geography		X	X	X	X
Socio-Economic			X	X	X
Social Capital				X	X
History					X
N	2,750	2,750	2,750	2,750	2,750

Note: Results in all specifications refer to the probit model estimated according to Equation 2. Reported coefficients refer to the marginal effect on $\text{WomenLeader}_{i,m,r}$ of one unit change in FemaleStreets_m.The dependent variable is the dummy variable related to gender perception towards female political leaders, $\text{WomenLeader}_{i,m,r}$ and it remains unchanged in all different specifications. The main independent variable is the variable FemaleStreets_m, the percentage of streets named after female. Personal controls include: age, educational attainment, marital status, gender, religiosity. Geographical controls (at the municipal level) include: an index of terrain asperity, the geodetic distance from the sea and a variable related to whether a city is a rural or urban area. Socio-economic controls (at the municipal level) entail: average income per capita of the municipality of residence, the number of manufacturing firms in 2017, resident population in 2017, population growth from 2011 to 2017, police expenditure, broadband coverage and FoundingMothers, a dummy variable related to the distance from founding mothers' birthplace. Social-capital is measured by the number of non-profit associations per capita in each municipality in 2011. Historical control consists of a dummy variable that accounts for the size of city in year 1300 C.E. All specifications include NUTS-3 regional fixed effects. Standard errors in parentheses are clustered at NUTS-3 level. The statistical significance of the test that the underlying coefficients is equal to zero is denoted by: * $p < 0.1$, ** $p < 0.05$, ***$p < 0.01$.

5.2 Robustness checks

This section validates the empirical approach by conducting robustness checks. One of the primary concerns pertains to the choice of the dependent variable; thus, the model is estimated using an alternative outcome. Specifically, another measure that captures the relationship between gender perception and the number of streets named after women is referred to in the analysis as *WomenManager*. Derived from the "Osservatorio Giovani" questionnaire, this variable is a dummy aimed at depicting individuals' gender perception. In this case, respondents are asked to provide their opinion on the statement "In general, men are better managers than women." Respondents choose an answer on a scale ranging from "*Completely disagree*" to "*Totally agree*". If the response to the statement is "*Completely disagree*", the value is coded as 1; otherwise, it is coded as 0. This particular question within the survey is chosen because, even today in Italy, the representation of women on company boards remains low across various types of companies (e.g., 22% in corporations, 7% in listed companies, and 6% in banking companies in 2011[22]). Table 3 presents the main results for the probit model with the alternative outcome. The findings confirm the robustness of the results, which remain largely consistent with those of the main outcome[23].

Secondly, another robustness check involves re-estimating the main specification while altering the main explanatory variable, i.e., the share of streets named after women, by transforming the continuous variable into a discrete one. Therefore, a dummy variable is created: it takes a value of 1 if the percentage of streets named after women exceeds the median, and 0 otherwise. This variable is denoted as $Dummyshare_m$. Table 4 illustrates that the effect remains positive and significant. In this scenario, the magnitude of the effect is larger compared to the results of the main specification. Indeed, in the most comprehensive specification, the effect of having one additional percentage point of streets named after women above the median increases the probability of having a more equitable perception towards gender equality by almost 5%. This represents approximately twice the effect size observed in the main specification with the continuous variable.

[22]Banca D'Italia, Consob, Dipartimento per le Pari Opportunità. *La partecipazione femminile negli organi di amministrazione e controllo delle società italiane*, 2021.

[23]The model is also validated by changing the estimation method, adopting a linear probability model. Results remain positive and significant and are reported in the Appendix 6.2.

Table 3: Other outcomes: *WomenManager*

Dependent Variable:	Womenmanager$_{i,m,r}$				
	(1)	(2)	(3)	(4)	(5)
FemaleStreets$_m$	0.0102	0.00916	0.0114*	0.0114*	0.0116*
	(0.00719)	(0.00626)	(0.00678)	(0.00676)	(0.00653)
NUTS-3 FE	X	X	X	X	X
Personal		X	X	X	X
Geography		X	X	X	X
Socio-Economic			X	X	X
Social Capital				X	X
History					X
N	2,793	2,793	2,793	2,793	2,793

Note: Results in all specifications refer to the probit model estimated according to Equation 2. Reported coefficients refer to the marginal effect on Womenmanager$_{i,m,r}$ of one unit change in FemaleStreets$_m$.The dependent variable is the dummy variable related to gender perception towards female manager, Womenmanager$_{i,m,r}$, and it remains unchanged in all different specifications. The main independent variable is the variable FemaleStreets$_m$, the percentage of streets named after female. Personal controls include: age, educational attainment, marital status, gender, religiosity. Geographical controls (at the municipal level) include: an index of terrain asperity, the geodetic distance from the sea and a variable related to whether a city is a rural or urban area. Socio-economic controls (at the municipal level) entail: average income per capita of the municipality of residence, the number of manufacturing firms in 2017, resident population in 2017, population growth from 2011 to 2017, police expenditure, broadband coverage and FoundingMothers, a dummy variable related to the distance from founding mothers' birthplace. Social-capital is measured by the number of non-profit associations per capita in each municipality in 2011. Historical control consists of a dummy variable that accounts for the size of city in year 1300 C.E. All specifications include NUTS-3 regional fixed effects. Standard errors in parentheses are clustered at NUTS-3 level. The statistical significance of the test that the underlying coefficients is equal to zero is denoted by: * p < 0.1, ** p < 0.05, ***p < 0.01.

Table 4: Other outcomes: *Dummy Share of female streets*

Dependent Variable:	Womenleader$_{i,m,r}$				
	(1)	(2)	(3)	(4)	(5)
Dummyshare$_m$	0.0377*	0.0354*	0.0488**	0.0491**	0.0484**
	(0.0201)	(0.0197)	(0.0209)	(0.0209)	(0.0209)
NUTS-3 FE	X	X	X	X	X
Personal		X	X	X	X
Geography		X	X	X	X
Socio-Economic			X	X	X
Social Capital				X	X
History					X
N	2,750	2,750	2,750	2,750	2,750

Note: Results in all specifications refer to the probit model estimated according to Equation 2. Reported coefficients refer to the marginal effect of Dummyshare$_m$ on Womenleader$_{i,m,r}$. The dependent variable is the dummy variable related to gender perception towards female political leaders, WomenLeader$_{i,m,r}$ and it remains unchanged in all different specifications shown in the Table. The main independent variable is the dummy variable Dummyshare$_m$: it assumes value 1 if the percentage of streets named after women is greater than the median, while is 0 otherwise. Personal controls include: age, educational attainment, marital status, gender, religiosity. Geographical controls (at the municipal level) include: an index of terrain asperity, the geodetic distance from the sea and a variable related to whether a city is a rural or urban area. Socio-economic controls (at the municipal level) entail: average income per capita of the municipality of residence, the number of manufacturing firms in 2017, resident population in 2017, population growth from 2011 to 2017, police expenditure, broadband coverage and FoundingMothers, a dummy variable related to the distance from founding mothers' birthplace. Social-capital is measured by the number of non-profit associations per capita in each municipality in 2011. Historical control consists of a dummy variable that accounts for the size of city in year 1300 C.E. All specifications include NUTS-3 regional fixed effects. Standard errors in parentheses are clustered at NUTS-3 level. The statistical significance of the test that the underlying coefficients is equal to zero is denoted by: * p < 0.1, ** p < 0.05, ***p < 0.01.

5.3 Assessing the confounding impact of unobservables: Oster test

Concerns about omitted variable bias are indeed prevalent in nonexperimental work in economics. Omitted variable bias occurs when a relevant variable that influences both the dependent and independent variables is not included in the analysis. This omission can lead to biased and inconsistent estimates of the relationships between variables. To mitigate omitted variable bias, economists employ various techniques such as including additional control variables, using instrumental variables, employing natural experiments, or employing fixed effects or random effects models. Despite these efforts, fully addressing omitted variable bias in nonexperimental work remains a challenge, and economists must carefully consider the potential impact of omitted variables on their findings and interpretations. The approach suggested by Altonji et al. (2005) aims to address concerns about omitted variable bias by assessing the robustness of results under the assumption that the relationship between treatment and unobservables can be inferred from the relationship between treatment and observables. This method provides a test statistic that evaluates how important unobservables would have to be relative to observables to eliminate the observed treatment effect. Recently, Oster (2019) extends the existing methodology and assumes that the relationship between treatment and unobservables can be inferred from the relationship between treatment and observables by explicitly linking the bias to coefficient stability. This work builds upon the framework established by Altonji et al. (2005) by adding the R-squared value to it, as outlined by Oster (2019). This additional step aims to further refine the estimation of bounds for omitted variable bias. To construct these bound estimates, two key pieces of information are required. Firstly, the value of δ is needed, which measures the relative degree of selection on observed and unobserved variables. Oster (2019) suggests assuming δ = 1, implying that the selection on observables is the same as that on unobservables. Secondly, the R-squared value from a hypothetical regression of the dependent variable on the treatment variable and a full list of observed and unobserved controls (denoted by $R^2{}_{Max}$) is needed. Oster (2019) suggests setting $R^2{}_{Max}$ equal to Min{1, 1.3 * R^2}, where R^2 comes from the baseline regression controlling for observed explanatory variables[24]. By incorporating both δ and $R^2{}_{Max}$ into the analysis, researchers can construct bound estimates that provide a range within which the true treatment effect is likely to lie, given the potential influence of omitted variable bias. This methodology offers a more nuanced understanding of the robustness of results to omitted variable bias and can help researchers make more informed interpretations of their findings. The identified set (or bounds) [β, β^*($R^2{}_{Max}$, δ=1)] includes the true

[24]The value 1.3*R^2 is suggested by Oster (2019) which analyses randomized-trial studies published in four top economics journals. This value serves as an empirical benchmark for setting the upper bound for $R^2{}_{Max}$ in the analysis.

estimate. β^* is estimated through the following equation:

$$\beta^* = \hat{\beta} - (\beta - \hat{\beta})\frac{(R^2_{\text{Max}} - \hat{R}^2)}{\hat{R}^2 - R^2} \tag{3}$$

where β and R^2 are obtained from the regression [25] of the dependent variable on the treatment variable with no controls, while $\hat{\beta}$ e $\hat{R}^2$ arise from the baseline regression with controls. If the identified set $[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 1)]$ does not include zero, then we can infer that the true effect of a treatment is non-zero, and that the baseline estimate $\hat{\beta}$ remains robust against potential selection on unobservables. Besides establishing whether the bounds include zero, we can also assess the width of the bound estimates. We explore this by incrementally increasing the value of δ from 1 to 2. As a result, we observe progressively larger upper bounds, reinforcing our conclusion that the inclusion of an additional street named after women would enhance a more egalitarian perception of gender. Table 1 presents the identified sets (bounds estimates).

Table 5: Bound estimates for Oster test

	$\hat{\beta}$	β^*
	$R^2_{\text{Max}} = 1.3R^2$	
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 1)]$	0.0128* (0.0065)	0.0156* (0.0061)
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 1.5)]$	0.0128* (0.0065)	0.0173** (0.0059)
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 2)]$	0.0128* (0.0065)	0.0192** (0.0063)
	$R^2_{\text{Max}} = 1.5R^2$	
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 1)]$	0.0128* (0.0065)	0.0176** (0.0068)
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 1.5)]$	0.0128* (0.0065)	0.0207** (0.0070)
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 2)]$	0.0128* (0.0065)	0.0249*** (0.0067)
	$R^2_{\text{Max}} = 1.7R^2$	
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 1)]$	0.0128* (0.0065)	0.0019*** (0.0068)
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 1.5)]$	0.0128* (0.0065)	0.0252*** (0.0072)
$[\hat{\beta}, \beta^*(R^2_{\text{Max}}, \delta = 2)]$	0.0128* (0.0065)	0.0333*** (0.0075)

Note: The dependent variable is $\text{Womenleader}_{i,m,r}$. The first column represents the identified sets (bound estimate) taking into consideration different level of δ. The result in the second column is the coefficient of the OLS estimate with the related standard error. The results in the third column are calculated using the Stata code *psacalc* byOster (2019). Standard errors of $\beta^*(R^2{}_{Max}, \delta)$ clustered at the individual level are obtained via boostrapping. The statistical significance of the test that the underlying coefficients is equal to zero is denoted by: * p < 0.1, ** p < 0.05, ***p < 0.01.

5.4 Heterogeneous treatment effects

The analysis is extended by investigating whether having a greater number of streets entitled to women increases the probability of having a higher awareness of gender

[25] The Oster test is performed on a linear probability model. The results are reported in the Appendix 6.2.

equality according to individuals' characteristics or socio-economic aspects. Firstly, the sample is split according to the level of education: individuals are divided between those who have at least a university degree and those who do not. Indeed, it is widely showed in literature that greater open-mindedness is associated to a higher level of education, thus reducing gender prejudices against women (Flabbi, 2012; Anelli et al., 2015). Furthermore, this association extends to individuals' parents' level of educational attainment(Farré and Vella, 2013; Nollenberger et al., 2016; González de San Román and De La Rica, 2012). Therefore, the sample is also divided into another sub-sample where individuals are split between those who have at least one parent with a bachelor's degree (or higher attainment) and those who do not. Indeed, parent's education indirectly relates to children's academic achievements (Davis-Kean, 2005). Table 6 presents the results: the main model (Equation 2) is re-estimated in the two sub-samples. Results highlight that the correlation between more equal gender perception and the number of streets named after women holds when considering non-graduated individuals and individuals with non-graduated parents, while it disappears for those with at least a degree. This suggests that the effect of a higher percentage of streets named after women is a powerful tool to influence non-educated individuals.

Furthermore, the sample is split according to the municipality's dimension and the degree of urbanisation. Firstly, the sample is divided in urban centres and internal areas. Literature suggests that inland areas often exhibit a greater sense of community compared to urban ones(Belanche et al., 2021; Casakin et al., 2015; Mandal and Phillips, 2022; Cassidy and McGrath, 2015). Therefore, street names reinforce the sense of belonging and could have a greater impact on the perception of women in these areas. Secondly, the sample is split according to population size: one might expect that in small towns with a population of less than 40,000, people would have a greater awareness of their surroundings. The choice of 40,000 as the cutoff is based on it being the median value. Therefore, individuals in smaller towns may be more influenced in terms of their values perception (e.g., gender perception) in everyday life (Oto-Peralías, 2018; Yu, 2014). Table 7 reports the results of main model's estimation in the sub-samples. Findings highlight that the correlation between gender perception and the percentage of female street names holds considering internal areas and smaller towns, whereas it disappears in urban and larger centres. This trend confirms the literature, describing a greater sense of community and attachment to place in less populated areas.

Table 6: Heterogeneous effect: Educational Attainment

Dependent Variable:	Womenleader$_{i,m,r}$			
	Individual Educational level		Parents Educational level	
	(1)	(2)	(3)	(4)
	Not Grad	Grad	ParNotGrad	ParGrad
FemaleStreets$_m$	0.0202**	0.0072	0.0167*	0.0185
	(0.0097)	(0.0113)	(0.0089)	(0.0243)
NUTS-3 FE	X	X	X	X
Personal	X	X	X	X
Geography	X	X	X	X
Socio-Economic	X	X	X	X
Social Capital	X	X	X	X
History	X	X	X	X
N	1,291	1,226	2,063	500

Note: all specifications are estimated by probit. The dependent variable is the dummy variable related to gender perception towards female political leader, Womenleader$_{i,m,r}$ and it remains unchanged in all different specifications shown in the Table. The main independent variable is the variable FemaleStreets$_m$, the percentage of streets named after female. Personal controls include: age, educational attainment, marital status, gender, religiosity. Geographical controls (at the municipal level) include: an index of terrain asperity, the geodetic distance from the sea and a variable related to whether a city is a rural or urban area. Socio-economic controls (at the municipal level) entail: average income per capita of the municipality of residence, the number of manufacturing firms in 2017, resident population in 2017, population growth from 2011 to 2017, police expenditure, broadband coverage and FoundingMothers, a dummy variable related to the distance from founding mothers' birthplace. Social-capital is measured by the number of non-profit associations per capita in each municipality in 2011. Historical control consists of a dummy variable that accounts for the size of city in year 1300 C.E. All specifications include regional fixed effects at NUTS-3 level. Standard errors are clustered at NUTS-3 level. The statistical significance of the test that the underlying coefficients is equal to zero is denoted by: * p < 0.1, ** p < 0.05, ***p < 0.01. Standard errors in parentheses.

Table 7: Heterogeneous effect: Degree of Urbanisation and Population

Dependent Variable:	Womenleader$_{i,m,r}$			
	Remoteness		Resident population	
	(1)	(2)	(3)	(4)
	Inland area	Urban area	SmallMunicip	BigMunicip
FemaleStreets$_m$	0.0493**	0.0106	0.0223**	-0.0009
	(0.0243)	(0.00827)	(0.0109)	(0.0153)
NUTS-3 FE	X	X	X	X
Personal	X	X	X	X
Geography	X	X	X	X
Socio-Economic	X	X	X	X
Social Capital	X	X	X	X
History	X	X	X	X
N	305	2,332	1,257	1,279

Note: all specifications are estimated by probit. The dependent variable is the dummy variable related to gender perception towards female political leader, Womenleader$_{i,m,r}$ and it remains unchanged in all different specifications shown in the Table. The main independent variable is the variable FemaleStreets$_m$, the percentage of streets named after female. Personal controls include: age, educational attainment, marital status, gender, religiosity. Geographical controls (at the municipal level) include: an index of terrain asperity, the geodetic distance from the sea and a variable related to whether a city is a rural or urban area. Socio-economic controls (at the municipal level) entail: average income per capita of the municipality of residence, the number of manufacturing firms in 2017, resident population in 2017, population growth from 2011 to 2017, police expenditure, broadband coverage and FoundingMothers, a dummy variable related to the distance from founding mothers' birthplace. Social-capital is measured by the number of non-profit associations per capita in each municipality in 2011. Historical control consists of a dummy variable that accounts for the size of city in year 1300 C.E. All specifications include regional fixed effects at NUTS-3 level. Standard errors are clustered at NUTS-3 level. The statistical significance of the test that the underlying coefficients is equal to zero is denoted by: * p < 0.1, ** p < 0.05, ***p < 0.01. Standard errors in parentheses.

6 Conclusions

As argued by Rose-Redwood et al. (2010), street names encapsulate social, cultural, and political heritage. Following the French Revolution, place naming assumed a pivotal role in constructing a shared past, extending beyond its primary function of organizing the urban landscape (Azaryahu, 1996). Researchers have particularly emphasized the relationship between street naming and various themes such as national identity, religiosity, and male dominance.

This study specifically delves into the latter aspect, examining the correlation between young Italians' perceptions of gender equality and the proportion of streets named after females in their municipality of residence. Drawing from Gutiérrez-Mora and Oto-Peralías (2022), this analysis leverages diverse data sources to construct an index representing the share of female-named streets relative to the total number of streets at the municipal level. Unlike Gutiérrez-Mora and Oto-Peralías (2022), which leverages regional-level data, this study utilizes an individual-level survey, enabling us to achieve greater granularity.

Following Oto-Peralías (2018), employing geographical cultural data and utilizing text analysis provides a quantitative approach to understanding gender biases. This methodology aligns well with Italy's context, where the process of street naming and renaming is mandated by law to the municipal council. Thus, considering toponymy as a source of data can offer valuable insights into the population's attitudes. The findings indicate that a one-unit increase in the proportion of female-named streets (%) is associated with a 1.3-1.6% increase in the likelihood of having a more equitable gender perception.

This study's contribution is twofold. Firstly, it enriches the literature on the utilization of urban toponymy to quantify social phenomena in Italy. While this relationship has been examined in a limited number of countries such as Spain (Oto-Peralías, 2018; Gutiérrez-Mora and Oto-Peralías, 2022), Great Britain (Oto-Peralías, 2017), and the United States (Tretter, 2011), it has not been explored in the Italian context until now. Secondly, our study focuses on a specific aspect of cultural and social values: gender perception, a topic that has received relatively less attention from researchers. The only notable exception is Gutiérrez-Mora and Oto-Peralías (2022), where this relationship is investigated in Spain. Thus, we believe that our study makes a valuable contribution by validating the external validity of findings about gender equality perception observed in other countries.(Gutiérrez-Mora and Oto-Peralías, 2022).

In summary, this study offers an innovative approach by depicting population attitudes towards gender equality in Italian municipalities using quantitative methods. Undoubtedly, achieving a more balanced representation of male and female figures in toponymy should be an aspirational goal for fostering a more egalitarian society.

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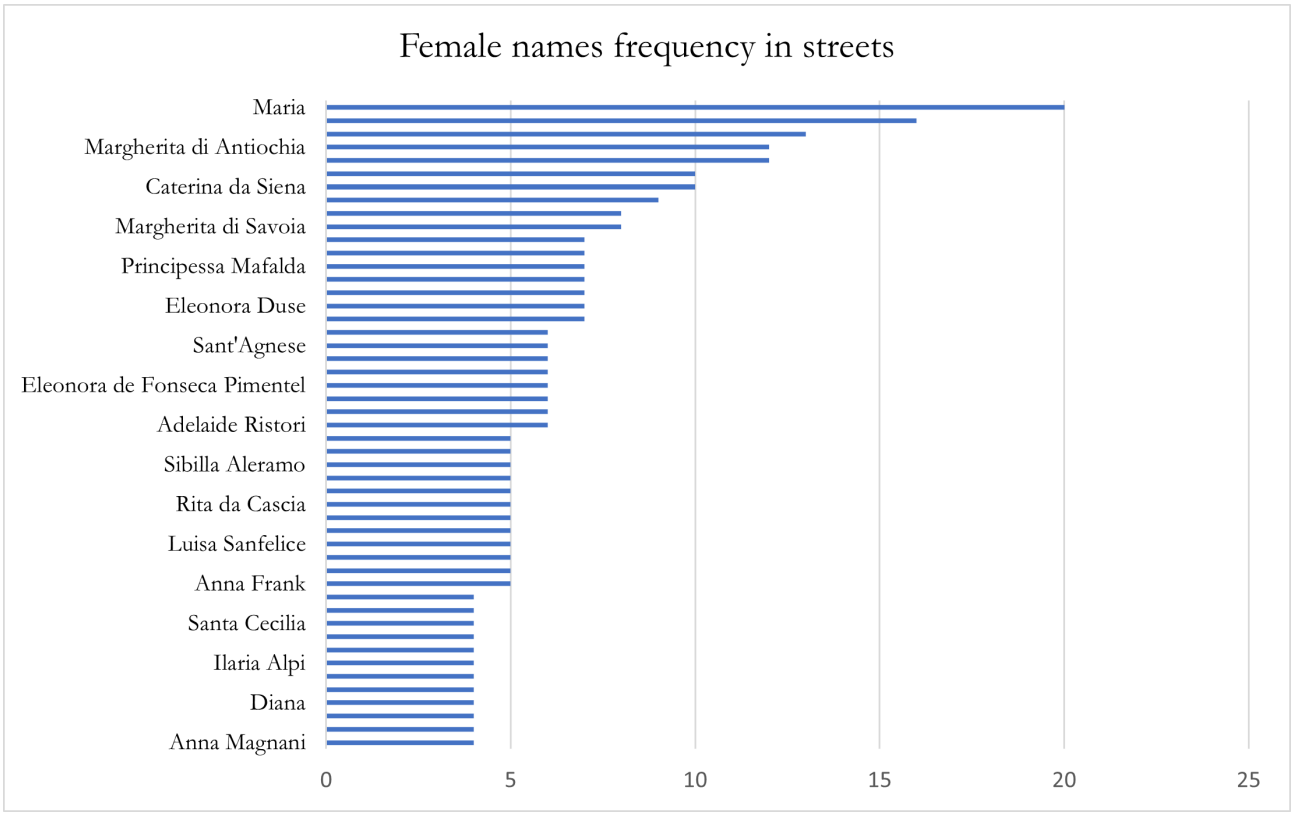
Appendix

6.1 Female names frequency in streets

Figure A1 reports recurrent female names in the streets of the 21 Italian regional capitals.

Figure A1: The recurrent female names in the 21 Italian regional capitals



Note: These names are taken from https://italy.mappingdiversity.eu/. The figure reports the first 17 most common female names in streets and their frequency, while full list of name used in this analysis is available upon request.

6.2 Alternative Estimation Strategy

For the sake of completeness, we replicate main results (5.1) by adopting a linear probability model. The results, as reported in Table A1, remain positive and significant in all specifications.

Table A1: Main Results - OLS Estimation

Dependent Variable:	WomenLeader$_{i,m,r}$				
	(1)	(2)	(3)	(4)	(5)
FemaleStreets$_m$	0.0126**	0.0119**	0.0132**	0.0131**	0.0128*
	(0.0061)	(0.0059)	(0.0065)	(0.0065)	(0.0065)
NUTS-3 FE	X	X	X	X	X
Personal		X	X	X	X
Geography		X	X	X	X
Socio-Economic			X	X	X
Social Capital				X	X
History					X
N	2,885	2,885	2,885	2,885	2,885

Note: Results in all specifications refer to the linear probability model. Reported coefficients refer to the marginal effect on WomenLeader$_{i,m,r}$ of one unit change in FemaleStreets$_m$.The dependent variable is the dummy variable related to gender perception towards female political leaders, WomenLeader$_{i,m,r}$ and it remains unchanged in all different specifications. The main independent variable is the variable FemaleStreets$_m$, the percentage of streets named after female. Personal controls include: age, educational attainment, marital status, gender, religiosity. Geographical controls (at the municipal level) include: an index of terrain asperity, the geodetic distance from the sea and a variable related to whether a city is a rural or urban area. Socio-economic controls (at the municipal level) entail: average income per capita of the municipality of residence, the number of manufacturing firms in 2017, resident population in 2017, population growth from 2011 to 2017, police expenditure, broadband coverage and FoundingMothers, a dummy variable related to the distance from founding mothers' birthplace. Social-capital is measured by the number of non-profit associations per capita in each municipality in 2011. Historical control consists of a dummy variable that accounts for the size of city in year 1300 C.E. All specifications include NUTS-3 regional fixed effects. Standard errors in parentheses are clustered at NUTS-3 level. The statistical significance of the test that the underlying coefficients is equal to zero is denoted by: * p < 0.1, ** p < 0.05, ***p < 0.01.