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Marriage patterns and the gender gap in labor force participation: Evidence from Italy ☆

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ABSTRACT

The Italian rate of gender participation gap, defined as the differential between female and male rates of labor force participation, was 18.2% in 2020, the second highest among EU countries. In this paper, we present evidence highlighting a new possible determinant of this unbalance in the labor force: endogamy intensity. We define endogamy as "marriage within the community", and we argue that it helps preserve and reinforce social norms stigmatizing working women, along with reducing the probability of divorce, which in turn disincentivizes women's participation in the labor force. We proxy the endogamy rate of a community by the degree of concentration of its surnames' distribution, and we provide evidence that a more intense custom of endogamy contributed to enlarging gender participation gaps across Italian municipalities in 2001. In order to deal with endogeneity issues, we make use of an instrumental variable strategy, by instrumenting the endogamy measure of a municipality by the degree of ruggedness of its territory: the asperity of a municipality's surface indeed contributes to its geographical isolation, thus incentivizing in- marriage. In our main 2SLS result, a standard deviation increase in our proxy of endogamy is linked to roughly a 0.3 standard deviation increase in the gender participation gap of 2001. In addition, we provide evidence supporting our main hypothesis, documenting how higher rates of in-marriage are linked to the preservation of social norms and to greater marriage stability, with a lower probability of divorce.

1. Introduction

When compared to other EU countries, Italy is still lagging in the integration of women into the labor market. According to Istat, the gender participation gap, defined as the difference between ratios of men and women of working age that participate in the labor force, was 18,2% in 2020, the second highest value in the European Union (after Malta). This gap has been declining in the last decades, with a decrease of 16,6% since 1971 (always according to Istat data), but it still remains a complicated and yet unsolved issue characterizing this country. The factors that led the peninsula to this situation of deep gender inequality are complex and multifaceted, from discouraging characteristics of the labor demand (such as the gender wage gap) to cultural reasons involving strict and long-standing social norms. We focus here on explaining Italian contemporaneous rates of the gender participation gap by looking at a new possible determinant: endogamy rates. We define endogamy as "marriage within the community", so a marriage between two individuals that belong to the same so- cial group, live in the same location, and share the same traditions and customs. We argue that endogamy generates two mechanisms limiting a community's female labor supply. From a first perspective, endogamy increases communities' social isolation, which helps preserve and reinforce traditional social norms and a more conservative role of the woman inside the household. In addition, endogamous unions are characterized by higher costs of dissolution with respect to exogamous ones, given the stronger social ties of the former communities. As a consequence, the probability of divorce is lower and this decreases incentives for wives to look for jobs, given the reduced need to have an "outside option" providing economic stability in case the marriage ends[1]. Keeping in mind these two mechanisms, our prediction is that if a custom of in-marriage is persistent in an Italian municipality (which is identified as a community in our anal-

[1] see Fern´andez and Wong (2014), Gray (1998) for a more complete explanation of the link between marital instability and female labor supply.

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ysis), it will exhibit lower contemporaneous levels of female labor force participation and larger gender participation gaps with respect to more "exogamous" municipalities. When we focus on how to technically evaluate this prediction, we encounter two identification issues: first, how to measure the intensity of endogamous marriages within a community, and second, to what extent we are able to detect a causal effect of endogamy on the gender participation gap. We decide to measure the past intensity of endogamy within a community through the diversity of its residents' surnames, exploiting the indexes by Buonanno and Vanin (2017). To address endogeneity concerns, namely omitted variable bias and reverse causality, we make use of an instrumental variable strategy: municipalities' intensity of in-marriage is instrumented by the degree of ruggedness of its territory. Here, the underlying logic is that the geographic fragmentation of a municipality's surface contributes to its isolation and augments the frequency of in-marriage, as it is confirmed by our first- stage regressions. The main concern of using this instrument is the validity of the exclusion restriction, since it has been demonstrated that ruggedness has direct and negative effects on economic activity (Nunn and Puga, 2012) and it could therefore generate a scarcity of jobs. To support the validity of our instrumental variable strategy, we extensively discuss the inclusion of controls in our specification preventing ruggedness from directly impacting our outcome of interest. In addition, in the online Appendix D we present a placebo analysis supporting the validity of the exclusion restriction assumption. However, even after control- ling for observables and performing this placebo, ruggedness could still be suspected to be an imperfect instrument: this is why in the online Appendix E we show that the effect of endogamy on the gender participation gap is robust even if we relax the exclusion restriction assumption, following the approach suggested by Nevo and Rosen (2012)[2].

Our main results show how the past intensity of endogamy within a community contributes to enlarging gender participation gaps across Italian municipalities in 2001. These results, confirmed by a series of robustness checks, shed light on a new perspective linking marriage patterns and female labor supply, providing a new explanation for the gender-unbalanced Italian labor force.

The paper is organized as follows: in Section 2 we discuss the related literature, with the contribution given by our work. In Section 3 we illustrate the problematic integration of women into the Italian labor force and explain how endogamy could have contributed to generating the current large gender participation gap in the peninsula. Section 4 describes our data and identification strategy, with a comprehensive discussion of the instrumental variable validity. Section 5 focuses on the main empirical results with the link between en- dogamy and the gender participation gap, and Section 6 discusses the channels that could have generated these results. We then perform a series of robustness checks in Section 7, confirming the soundness of the main results. Finally, Section 8 concludes.

2. Related literature

When we focus on the determinants of female labor force participation, the current literature offers a multifaceted picture, identifying factors such as the characteristics of the labor market (Olivetti and Petrongolo, 2016; Attanasio et al., 2008), going through the availability of childcare (Attanasio et al., 2008; Carta and Rizzica, 2018) but also medical advances such as the invention of the contraceptive pill (Bailey, 2006; Goldin and Katz, 2002) or in general improved maternal health conditions (Albanesi and Olivetti, 2016). However, these factors offer just a partial picture, given that the literature explained how women's decision not to work is frequently dictated by social norms and how their role inside the society is perceived (Fernandez and Fogli, 2009; Fern´andez, 2013; Bertrand et al., 2015). These norms are enforced by the community in which an individual lives and impose a standardized model of behavior for a social category. In the case of women, this model usually includes the chores of housekeeping and childcare: if a woman does not adapt to this "archetype", she suffers a cost in terms of social stigma by the community (Akerlof and Kranton, 2000) or even inner sense of guilt (Barigozzi et al., 2018). The influence of neighbors has been proven to be fundamental in the transmission of norms to young women (Maurin and Mos- chion, 2009; Cavapozzi et al., 2021), who frequently base their decision to work or not also on what they learn from their peers and parents. The literature presents evidence proving that the origins of gender roles could be determined by ancient agricultural practices: specifi- cally, descendants of societies that traditionally used the plough exhibit lower rates of female participation into work, politics and entrepreneurship today (Alesina et al., 2013). In the case of our project, we contribute to the understanding of why specific social norms survive in some places while they disappear in others, identifying a new possible determinant of their persistence. In addition to the studies on female labor, our research aims to contribute also to the literature about the effects of endogamy. This literature has been emphasizing how endogamy, and in particular consanguineous marriages, can be detrimental to the birth of inclusive institutions, contributing to generating more hierarchical societies (Greif and Tabellini, 2017). In line with our theoretical framework, in-marriage rates raise individuals' sense of belonging to their kinship or community, discouraging impartial cooperation and penalizing interaction with strangers (Akbari et al., 2019). In addition, higher consanguineous marriage rates have been linked to lower current levels of generalized trust, impersonal co- operation and individualism, consequently hindering economic cooperation and development (Schulz et al., 2019). Moreover, endogamy has been linked to higher levels of corruption (Akbari et al., 2019) and lower women's enfranchisement in India (Bahrami-Rad, 2021). However, the connection between the intensity of in-marriage within a community and the characteristics of its labor force still constitutes a gap in this growing literature: this work aims at providing evidence of the link between endogamy and the gender participation gap.

3. Female labor in Italy and the role of endogamy

Given its strong and deeply-rooted Catholic origins, Italy has, more than other developed countries, maintained a more traditional familiar model, in which the mother is cherished as a symbol of matronly warmth and nurturing. The idea of the Italian mother has "turned into an international stereotype - a strong, capable woman who spends her days cooking for her children" (Kovick, 2021). Speaking of female empowerment in Italy, the evolution of the Italian law system suggests deep-rooted negative prejudices about enfranchised women (Passaniti, 2011): for instance, until 1919 the Italian Civil Code imposed on wives wishing to find an occupation the need to present a written marital authorization. In addition, until 1975 the Civil Code stated that "the husband is the head of the family, and the wife must support his decisions" (art.144). It was not until 1945 that all women were granted the right to vote in national elections and, while the right to divorce was not introduced until 1970, abortion was not legally possible until 1978. All these anecdotes suggest the existence of specific social norms with a precise role of the woman inside the households, incompatible with high-profile career jobs. It seems that in Italy those social norms still survive in some places but were overcome in others: especially in the Southern Italian regions, the role of women is still that of raising children and taking care of house chores. In fact, according to data from Swimez ("Associazione per lo sviluppo dell'industria nel Mezzogiorno"), the percentage of children aged 0-3 that benefited from public childcare was 5% for Southern regions, while it was 17,8% for Center-Northern Italian regions (Gruppo SVIMEZ, 2022). Furthermore, the average per capita public spending for social services (such as disabled people assistance)

[2] In few words, the approach consists in allowing some degree of correlation between the instrument and the error term in the IV framework.

was three times higher for Northern regions with respect to Southern ones (155 against 52 euros for the averages at the municipality level). Clearly, those data reflect also the well-known underdevelopment and low quality of institutions in Southern regions (Putnam et al., 1994), but there is also a cultural component that contributes to maintaining the central role of women in taking care of the weaker members of the family. Thus, we may wonder what is preserving such a traditional model inside those households: this project offers a new explanation, identifying the intensity of endogamy within a municipality as a possible determinant of the conservation and enforcement of traditional social norms, consequently lowering local levels of female labor supply. As we anticipated previously, we define endogamy as "marriage within the community", so a marriage between two people that belong to the same social group, live in the same location and share the same traditions and customs, for instance speaking the same dialect. An example of an endogamous union is represented by a consanguineous marriage, that is matrimony between two people from the same family: however, here we intend endogamy in a broader sense, referring to people united by a common heritage of customs and usages and who live spatially close to each other. It is obviously complex to give a precise definition of community and to identify its social borders: therefore, in our analysis we identify communities with the 8000 Italian municipalities[3]. We argue that endogamy creates a closed system that helps preserve and reinforce traditional social norms and a more conservative role of the woman inside the household. Indeed, when a community is characterized by a high intensity of in-marriage and there is no influx of new individuals bringing different social norms, costumes and traditions are more easily maintained, and consequently traditional social norms are somehow sheltered. As Akbari et al. (2019) demonstrate, communities with higher degrees of endogamy tend to preserve a more traditional and kinship-based structure, discouraging cooperation with non- members and therefore the influx of new social norms. In a similar way, we can think of a parallelism with the Indian caste-based system, which is based on endogamous unions to preserve traditions and customs, with a gender-based system of punishment for those who marry outside the caste (Bidner and Eswaran, 2015). Moreover, endogamy has been linked to more unequal gender norms and a higher acceptance of domestic violence across African communities (Alesina et al., 2021). Here, our point is that Italian communities that experienced higher rates of endogamy maintained a more conservative view of the woman inside the family, hence keeping a larger gender participation gap with respect to more exogamous communities [4]. In our analysis, the past levels of in-marriage within a municipality proxy both the degree of conservation of the traditional gender roles in the community and the intensity of enforcement of the social norms that a woman living in the community must observe. The more those gender norms are maintained and enforced, the costlier it is for a woman to default, given the dynamics of social stigma and sense of guilt that we mentioned previously, and the more likely it is that she aligns with the traditional model of housewife. Thus, we argue that a stronger custom of in-marriage across Italian municipalities is associated with the preservation of gender norms stigmatizing working women[5]

In addition to the maintenance and enforcement of social norms, endogamy creates another indirect mechanism reducing female labor supply, that is through the reduction of the prob- ability of divorce. According to pre-existing evidence, divorce rates have been demonstrated to be lower for endogamous unions (Houseworth and Chiswick, 2020; Davenport, 2016). This link is not exclusive to developing countries, but it seems to be present also in developed ones such as Netherlands or Sweden, with marriages between locals and foreigners being more likely to end up in divorce (Smith et al., 2012), and with higher risks of separation for spouses with larger cultural distances (Dribe and Lundh, 2012). We argue that endogamous unions are characterized by higher costs of dissolution with respect to exogamous ones, because of the heavier social stigma on couples that separate. This is because divorcing implies breaking the ties between the couple and its community and exiting from the closed system that endogamy preserves. A community that has been marrying "inside" for decades strengthens the social bonding between its members, who feel a powerful sense of affinity between themselves. Divorcing from a community member would fracture the community ties, and thus it is stigmatized by all other members of the social group who feel "betrayed". Therefore, given this higher cost of separation for endogamous couples, we argue that the probability of divorce is lower with respect to non-endogamous ones. As a consequence, the wife is less incentivized to look for an outside option to provide economic stability in case the marriage ends, given the higher solidity of endogamous marriages. In fact, there is evidence that a higher probability of divorce and marital instability can generate an increase in female labor force participation (Fern´andez and Wong, 2014; Gray, 1998). Hence, we argue that if a custom of in-marriage is persistent in a community, women will be less incentivized to participate in the labor force also by reason of the lower probability of divorce. We analyze the channels linking endogamy and the gender participation gap in Section 6.

4. Data and identification strategy

To evaluate the major argument of the paper, we make use of a model with the following functional form:

$$Partgap_i = \alpha + \beta Endogamy_i + \gamma X_i + \epsilon_i$$

With:

- $Partgap_i$ corresponding to the rate of gender participation gap in municipality i, that is the difference between rates of men and women aged 15-64 who joined the labor force (in 2001);
- $Endogamy_i$ measuring the intensity of in-marriage within the municipality i;
- X_i set of geographic and demographic controls for municipality i

The core of this project is developed around the estimation of β, and the assessment of the effect of in-marriage rates on our outcome. In this section, we first describe the character- istics of our outcome and treatment, and then we proceed by explaining more in detail the identification strategy of the project.

Starting from our outcome, official statistics available from ISTAT indicate that the Ital- ian gender participation gap was 18.2% in the second quarter of 2020, the second highest among the EU countries[6]. In Fig. 1 we can see on the left a graph showing our outcome, the differential between participation rates of men and women in 2001, also known as "gender participation gap". To give an idea of the low involvement of women in the Italian labor force, on the right we present also the

[3] The approximation of identifying communities with municipalities could be controversial, since municipal- ities with larger population might clearly include multiple communities. In Section 7 we thus repeat our analysis but on a subsample of municipalities with less than 5000 inhabitants, that are more likely to be associated with distinct communities.

[4] We focus on the gender gap and not only on the female labor supply since the former variable is a more reasonable indicator of the gender inequality brought by traditional social norms

[5] It might be argued that this mechanism may also contribute to maintaining a high level of female labor supply. In fact, since endogamy preserves the traditional social norms of society, if the community's norm dictates that women should participate in the labor force, a larger custom of endogamy may help reinforce and maintain this norm. However, as anecdotal evidence suggests, in Italy conservative social norms stigmatize working women and thus this is the custom most likely to be preserved by endogamy.

[6] We choose to focus on the gender participation gap and not exclusively on female labor force participation because the main interest of this project relies on understanding the gender inequality characterizing the Italian labor force. Indeed, low rates of female labor supply alone do not identify a gender-unbalanced labor force, while a large gender participation gap does.

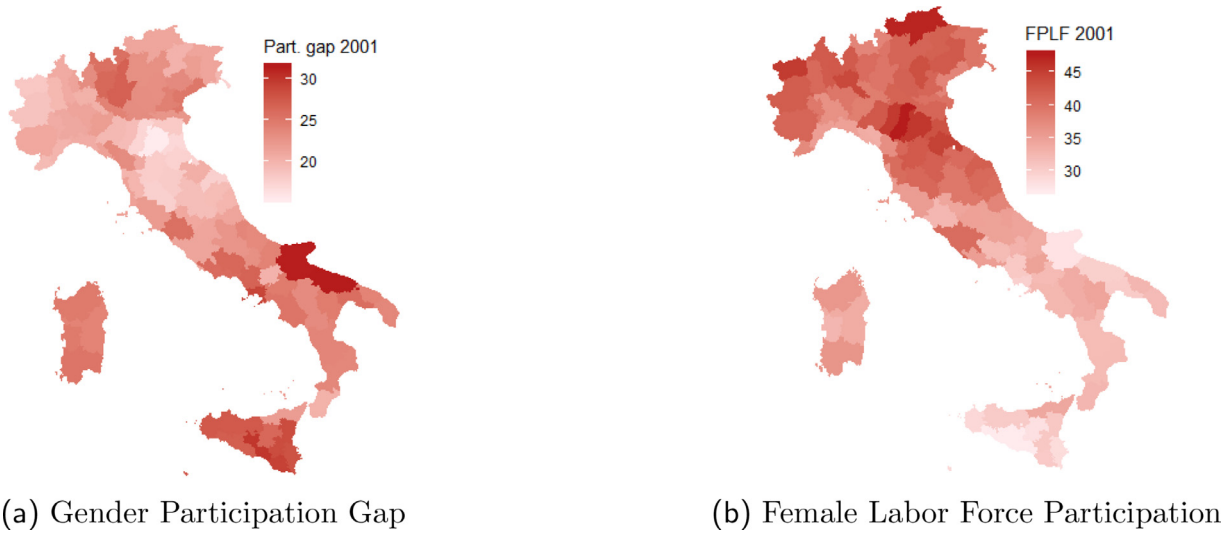


Fig. 1. Labor force in Italy - 2001.
Notes: Fig. 1a shows the gender participation gap, namely the difference between rates of working- age men (15-64 years old) participating in the labor force and working-age women participating in the labor force. Fig. 1b shows exclusively the rates of working-age women participating in the labor force. Data are according to the 2001 census and are aggregated at the province level to provide an easier eye-catcher of the characteristics of our outcome. Data include all 107 Italian provinces in 2001.

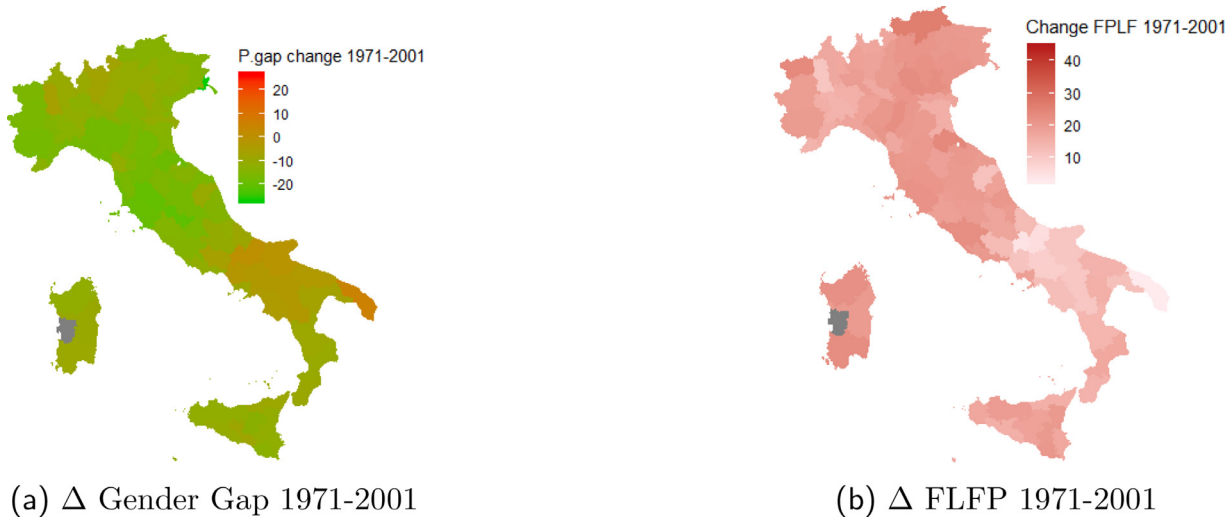


Fig. 2. Variations Part. gap, Female Labor Force Participation.
Notes: Fig. 2a shows variations in gender participation gaps between 1971 and 2001, with greener areas representing a reduction of the gap and reddish areas standing for an increase. Fig. 2b shows variations in rates of working-age women participating in the labor force between 1971 and 2001. Data are according to the censuses of 1971 and 2001 and are aggregated at the province level. Data include all 107 Italian provinces in 2001.

"Female Labor Force Participation" (percentages of women aged 15-64 participating in the labor force).

Especially the southern Italian regions, historically characterized by lower institutional quality (Putnam et al., 1994), have lagged in reducing this kind of gender inequality. The gender participation gap reaches impressive peaks of over 30% in the southern provinces of Foggia and Caltanissetta, that present the worst gap among the 110 Italian provinces. To grasp the idea of the persistence of this kind of inequality across Italian provinces, in Fig. 2 we show how these two variables changed between 1971 and 2001:

On the left, we present the changes in the gender participation gap for those 30 years, with the green areas indicating a decrease while the red areas represent an increase in this gap. We can observe again smaller reductions in southern Italy, with some provinces even exhibiting an increase in the gender participation gap. On the right, we can see the change in rates of women participating in the labor force between 1971 and 2001, and we can notice a positive trend everywhere, with higher variations in the Center-North provinces. As we can notice, there is a high persistence of the low rates of female labor force participation in some provinces: we argue that the survival of traditional gender roles is a key factor in explaining this persistence. In line with what we presented in the previous sections, our point is that the frequency of in-marriage has been a determinant of the survival of conservative social norms, leading to the permanence of the scarce levels of female labor supply in some parts of the peninsula. Indeed, we could think of the variable endogamy as a proxy of the strength of maintenance and enforcement of conservative gender roles.

When we aim to identify the relationship between endogamy and the gender participation gap, the first question we need to address is how to measure these variables. While for rates of men and women joining the labor force we have official data from the census of 2001, determining the frequency of in-marriage is trickier. We decided to proxy

the intensity of endogamy at the municipality level with the surnames' distribution, from the work of Buonanno and Vanin (2017). For each municipality, they computed how frequent a specific surname is within the resident population, by looking at the percentages of residents with the same surname. The data source exploited to construct surnames' distributions was the national telephone directory, which virtually covered all households for the two years of focus, namely 1993 and 2004[7]. In particular, they offered two different, and somehow opposite, measures of surnames' concentration:

1. *Entropy* (available for 1993). This measure is directly proportional to the diversity of surnames in a specific municipality, and has the following specification:

$$Entropy = -\sum_{i=1}^{S} (p_i log p_i)$$

With S total number of surnames in the municipality of interest and p_i the percentage of people with the surname i. Therefore, the more variable surnames are in a municipality, the higher is the value of *Entropy*.

2. *First share* (available for 1993 and 2004). This variable quantifies the percentage of residents with the most common surname in the municipality, thus it estimates the extent of concentration in surnames' distribution.

Those two measures are opposite in the sense that *Entropy* quantifies the spread in sur- names' distribution, while *Firstshare* its concentration. Moreover, their main difference is that *Entropy* takes into account all surnames in a specific municipality, while *Firstshare* only the most frequent one. The link with endogamy is simple: the diversity of surnames re- flects a community's recent history of migration and in-marriage. When a community is more socially isolated, its members marry between each other more frequently and thus the distri- bution of surnames shrinks [8]. Surnames' diversity can tell many things about a community, from genetic characteristics to the degree of inbreeding (Crow and Mange, 1965). In partic- ular, since surnames among patrilinear societies are transmitted from father to children, the distribution of surnames is similar to that of any social or cultural trait (Cavalli-Sforza et al., 2004; Darlu et al., 2012; Cavalli-Sforza and Feldman, 1981), and at the same time to the spread of the neutral alleles of a gene inherited exclusively through the Y-chromosome (Yasuda and Furusho, 1971; Yasuda et al., 1974). In our specific case, we argue that these two measures of surnames distribution capture the past intensity of endogamy within a community: a municipality that exhibited a tendency towards in-marriage would be char- acterized by a smaller *Entropy* and a larger *Firstshare*. Indeed, two individuals having the same surname are more likely to belong to the same community or social group: a higher homogeneity of surnames within a city signals that people have been marrying inside the community more frequently, reducing surnames' distribution. Therefore, in our empirical analysis we consider endogamous a marriage whose progeny is not expanding the surnames' distribution of a municipality, while a non-endogamous marriage is potentially enlarging this distribution[9]. In Fig. 3 we can see the distribution of those two measures across Italy, with *Entropy* in 1993 on the left and *Firstshare* in 2004 on the right.

In Fig. 4, we present the density functions of those two variables, together with some summary statistics in Table 1.

[7] We chose to use data from the 2001 census and not the most recent one from 2011 because of the higher temporal proximity to our treatment variables. Indeed, using data from 2011 might increase the worry of possible migration waves affecting the results of our analysis.

[8] Since the unification of Italy in 1861, laws concerning the inheritance of surnames have remained un- changed, with sons and daughters inheriting the father's surname.

[9] An example of a non-endogamous marriage in our case is that of a woman from a municipality marrying an individual from another municipality, whose surname is not present in the woman's municipality.

Table 1
Summary statistics for Entropy 1993 and First share in 2004.

Variable	Obs	Mean	Std.Dev.	Min	Max
Entropy 1993	8,074	5.31	1.12	1.66	10.19
First Share 2004	8,090	3.93	3.78	0	81.32

Notes: Fig. 4a shows the density function of the variable Entropy in 1993, while Fig. 4b illustrates the density function of First share in 2004. Table 1 describes some summary statistics for the variables Entropy in 1993 and First share in 2004. Number of observations, mean, standard deviation, minimum and maximum values are reported. Data from Buonanno and Vanin (2017) include all 8090 Italian municipalities in the case of First Share, and 8074 in the case of Entropy.

Table 2
Summary statistics for average ruggedness.

Variable	Obs	Mean	Std.Dev.	Min	Max
Avg Ruggedness (m)	8,074	224.27	215.76	0	1151.44

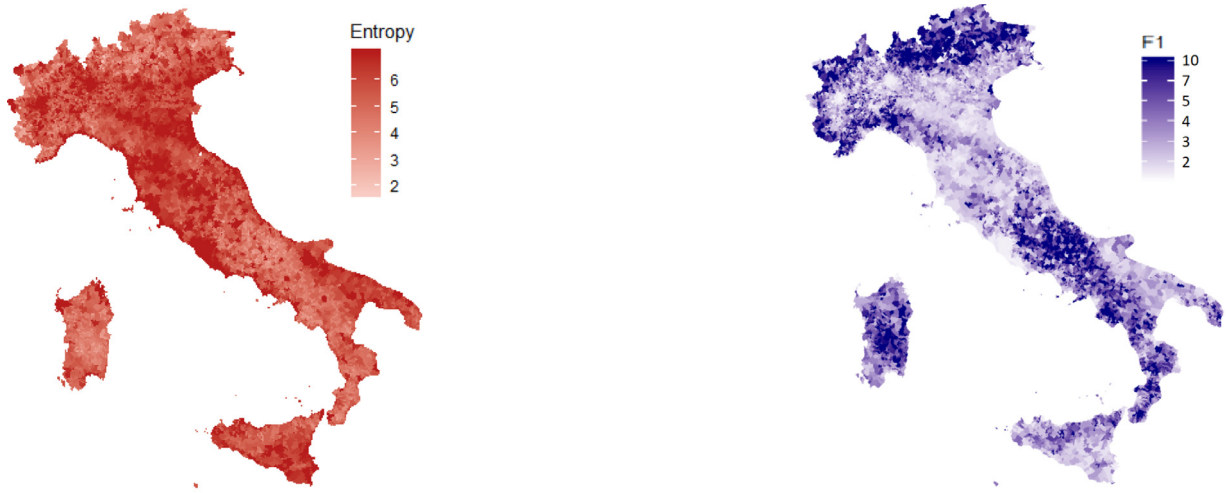
Notes: Fig. 5a shows the distribution of ruggedness across Italian municipalities, while Fig. 5b illustrates its density function. Table 2 describes some summary statistics for ruggedness. Number of observations, mean, standard deviation, minimum and maximum values are reported. Ruggedness is measured in meters. Data from Buonanno and Vanin (2017) include 8074 out of 8090 Italian municipalities.

As we can see, their densities are extremely different, as *Entropy* resembles a normal distribution and *Firstshare* is way more right-skewed. This is not particularly surprising as *Firstshare* takes into account only the most common surname in the municipality, while *Entropy* all of them. The year of reference of those two variables, as we pointed out, is 1993 for *Entropy* and 2004 for *Firstshare*: we can assume that they proxy the intensity of endogamy rates of the previous decades. As we explained previously, we can interpret the intensity of endogamy as a proxy for the conservation and enforcement of traditional social norms. One of the most worrying confounders for the use of these proxies for endogamy is that the diversity of surnames is also a consequence of migration waves: in the online Appendix A we discuss further this confounder and argue why it should not bias our results.

4.1. Sources of endogeneity and identification strategy

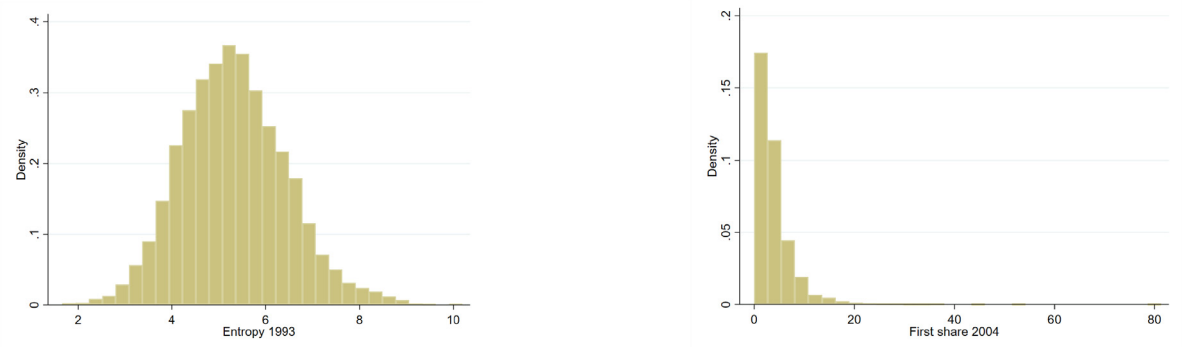
Our identification strategy relies on the use of instrumental variables in order to prove that endogamous marriages generate larger gender participation gaps. In fact, there might be two possible sources of endogeneity when we assess the relationship between these two variables through simple OLS:

1. Omitted variable: as Cavalli-Sforza et al. (2004) argue, there is a large variety of el- ements influencing the frequency of in-marriage, namely the financial stimulus not to disperse the familiar patrimony, literacy rates, birth rates, industrialization, the impor-tance of family values, population size, size of the extended family, ruralization. Since some of these elements might impact differently men's and women's labor supplies, we could have an endogeneity problem. While we can control for some of these factors, such as literacy rates, others (e.g. importance of family values) are difficult to measure and include in our regressions, creating an omitted variable bias in OLS' estimated coefficients.
2. Reverse causality: the effect that we theorized might be reversed, since having a high share of non-working women in a community might increase its endogamy rate. As a matter of fact, not having a job reduces the number of social exchanges outside an individual's community: even working part-time as a company's secretary expands the frequency of "outer" interactions that a woman can have with respect to a housewife. As a consequence, it might be more likely that a non-working woman ends up marrying one of the mem-



(a) Entropy 1993 (b) First share 2004

Fig. 3. Entropy in 1993 and First share in 2004.
Notes: Fig. 3a shows the distribution of our variable Entropy across Italian municipalities in 1993. Here, reddish areas indicate municipalities with more variable surnames distributions. Fig. 3b illustrates the distribution of the variable First share in 2004, always at the municipality level. In this case, the bluer areas have more concentrated surnames distributions. Data from Buonanno and Vanin (2017) include all 8090 Italian municipalities in the case of First Share, and 8074 in the case of Entropy.



(a) Entropy 1993 (b) First share 2004

Fig. 4. Entropy and First share density functions.

bers of her community simply because she has contact exclusively with them.

Therefore, when we estimate the relationship between endogamy and rates of gender partic- ipation gap through simple OLS, the coefficients that we obtain may be biased[10].

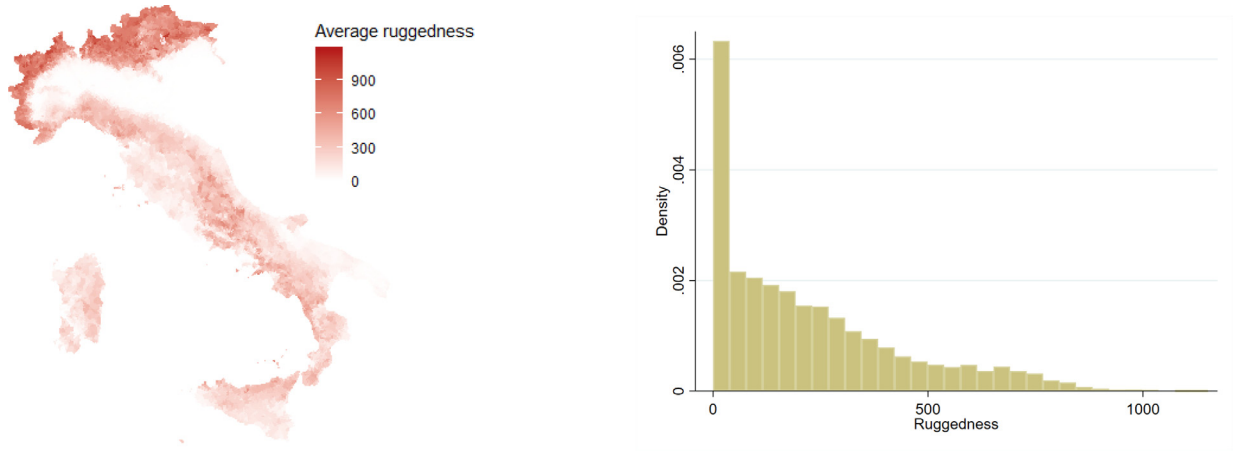
To reduce the first of the two concerns we listed, we include in our specification a set of controls at the municipality level, namely:

- Geographic controls
- Demographic controls [11]
- "Sistema Locale del Lavoro" fixed effects. Italy can be virtually divided into 686 "Sistema Locale del Lavoro" ("Local Labor Markets"), which are territorial cir- cumscriptions that take into account how people commute and move daily to go to their workplace. The average local labor market circumscription in Italy comprises 7 municipalities and has a surface extension of 335 square kilometers.

The inclusion of SLL fixed effects aims to capture possible unobserved differences in terms of characteristics of the labor market between these territorial circumscriptions. However, even with the inclusion of these controls we cannot exclude the possibility of other potentially relevant omitted variables correlated with both the endogamy proxies and rates of gender participation gap, and reverse causality might still bias our results. Using a measure of endogamy from 1993 (Entropy) reduces the concern of reverse causality: even if the treatment and the outcome are two variables characterized by sluggishness, the time distance in this case (8 years) should reduce the worry of possible effects of the gender gap on endogamy. Nevertheless, some reverse causality effects might still persist: this is why we recur to an instrumental variable strategy in order to assess our causal relationship of interest. Specifically, we instrument endogamy rates at the municipality level with the average degree of ruggedness of the municipality's territory. Ruggedness is a measure of irregularity of the land that is available at a disaggregated level again from the same dataset of Buonanno and Vanin (2017), who constructed it from the Global Land One-km Base

[10] In the case of reverse causality, the direction of the bias should be positive: more endogamy generates less working women (thus, larger gender participation gap) who are more likely to marry inside the community, thus increasing the endogamy level. Therefore, the OLS coefficient should be downward biased in the case of *Entropy* and upward biased in the case of *First share*. On the other hand, the direction of the bias might be both upward-biased or downward-biased by the omitted variables.

[11] See the online Appendix B for the entire list of controls



(a) Average ruggedness (m) (b) Ruggedness density function

Fig. 5. Ruggedness' distribution and density function.

Elevation Project (GLOBE). Ruggedness weights lands' average differences in elevation, thus giving a sense of how arduous the transition through a territory is[12]. In Fig. 5 we present a map of how the average ruggedness index varies across Italian municipalities, together with its summary statistics and density function:

The relationship between ruggedness and endogamy is straightforward: more rugged lands are harder to traverse and live in, thus communities living in such areas are more geographically isolated. Therefore, we argue that this kind of isolation incentives marriage within the community, given the geographical obstacles in finding outer partners. Our first stage has the following specification:

$$Endogamy_i = \delta + \vartheta Ruggedness_i + \lambda X_i + u_i$$

With *Ruggedness* the average ruggedness level for municipality i. When we implement our 2SLS regression, the coefficient obtained captures the so-called Local Average Treatment Effect (LATE). In other words, it estimates the effect of the treatment "Endogamy" on the gender participation gap for those municipalities for which treatment status, i.e. the rate of in-marriage, has been changed by the instrument *Ruggedness*.

4.2. Validity of the instrumental variable

Following Angrist and Imbens (1995), for our identification strategy to capture the correct LATE-effect of endogamy on the gender participation gap, five assumptions concerning the instrument must hold. In this section, we discuss exclusively the most problematic one, namely the exclusion restriction validity, while we leave the discussion on the other four assumptions to the online Appendix C. For the exclusion restriction to hold, our instrument, ruggedness, should not have a direct impact on the gender participation gap, the outcome. However, there is evidence that ruggedness directly influences economic activity (Nunn and Puga, 2012): rugged territories are harder to cultivate, obstacle transportation of goods, and make it more difficult to build infrastructures, thus creating a scarcity of jobs. This direct effect on economic activity might impact labor market characteristics, and therefore demand or supply of female labor. To address this concern, we focus on the main channels through which ruggedness affects the economic system: agriculture, road system, and labor market characteristics. In order to prevent ruggedness from directly impacting our outcome through either one of these channels, we include in our analysis controls at the municipality level for all of them, as we discuss next.

- Agriculture: Ruggedness' effect in terms of deterrence of agricultural activities is captured by "suitability for agriculture" control (available from Istat, referred to 2001), the percentage of land possible to cultivate. We argue that this control is the most exogenous one among all variables describing agricultural activities since it directly measures a characteristic of the territory[13]. Moreover, we know from a recent paper by Boone and Wilse-Samson (2021) that more rugged areas are less suitable for mechanization and are characterized by less capital-intensive production. In Section 7.3, we discuss in detail this further concern and show how ruggedness is not influencing individuals' occupational choices across Italian municipalities.
- Road connection: We include a "Roman roads" dummy in our analysis (indicating the historical presence of a main road connecting the municipality during the Roman empire) which should prevent ruggedness to influence labor market's characteristics by impeding the creation of connections and transportation of goods to a municipality. Indeed, the road system created during the Roman empire constituted the main skeleton of what is Italy's contemporaneous transportation network (Buonanno and Vanin (2017)). Given the historical reference of this variable, we can argue that it is less influenced by the most recent heterogeneous levels of economic development across Italy with respect to contemporaneous measures of municipalities' road connections, and therefore it is less subject to endogeneity concerns. Thus, if ruggedness influenced female or male labor supply by reducing the availability of transports and connections, this heterogeneous effect across municipalities should be captured by our Roman Roads dummy[14].

[12] To construct this measure, the Italian territory was divided into cells at 10-minute spatial resolution (approximately 1 squared kilometer of surface). Then, it was computed the difference in elevation between the centroid of each cell and each of the centroids in each of its eight confining directions (north, northeast, east, southeast, south, southwest, west, and northwest). Then, each cell's ruggedness measure is given by the squared root of the sum of the squared differences in elevation between the central point and the eight adjacent centroids. Finally, each municipality's ruggedness index is the average ruggedness level of its cells.

[13] Conversely, variables such as the number of agricultural cooperatives or percentages of residents employed in the agricultural sectors are more endogenous to our dependent variable, and may depend on other unobservables (e.g. the existence of cooperatives depends on the level of civicness of a community (Putnam et al., 1994), which might also have an impact on female labor supply.)

[14] Moreover, to further reduce the worry of ruggedness affecting the degree of individuals' mobility, we include a control for the percentage of commuters over the resident population (namely, the percentage of residents moving daily out of the municipality for work reasons).

Table 3
Effect of endogamy on gender participation gap - OLS.

	Dependent variable:					
	Participation gap 2001					
	OLS	OLS	OLS	OLS	OLS	OLS
Entropy 1993	-0.575***		-0.829***		-0.227*	
	(0.196)		(0.221)		(0.118)	
First share 2004		0.187***		0.240***		0.037*
		(0.046)		(0.045)		(0.022)
Geographic controls	No	No	Yes	Yes	Yes	Yes
Demographic controls	No	No	No	No	Yes	Yes
SLL FE	No	No	No	No	Yes	Yes
Observations	7,726	7,726	7,726	7,726	7,726	7,726
R-squared	0.015	0.017	0.045	0.046	0.550	0.549

Note: Standard OLS regressions. The dependent variable is the gender participation gap in 2001 (male labor force participation - female labor force participation), while the explanatory variables of interest are Entropy 1993 in the first case and First share 2004 in the second one. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

- Other labor market characteristics: Ruggedness could generate a scarcity of jobs for the unwillingness of companies to do business in those irregular territories, generating high unemployment rates that might discourage women from entering the labor force. Furthermore, given the scarcity of jobs, we may think of other possible dynamics in rugged territories, such as employers deciding to offer jobs with a gender bias, and preferring to fill vacancies with men. In line with the conservation of traditional gender roles, we may think of the preservation of prejudices about productivity levels of men and women in the more "endogamous" communities. To reduce concerns about these other possible direct effects of ruggedness, we include controls for the gender unemployment gap (difference between unemployment rates of men and women) and for the percentage of graduated women. Last, we include "Sistema locale del lavoro" (local labor market) fixed effects, which should capture other possible and unobserved consequences of higher ruggedness levels on the labor market. In other words, the effects of endogamy on the gender gap that we present in Section 5 are observed within the same local labor market.

The inclusion of all these controls should prevent ruggedness from directly impacting the gender participation gap by generating adverse conditions in the labor market[15]. After their inclusion in our regression, we can assume the effect of ruggedness on the gender participation gap to be exclusively through the increase of endogamy within a community[16]. Moreover, to provide an additional robustness check supporting the validity of the exclusion restriction, we perform a placebo test in the online Appendix D, demonstrating that on subsamples of municipalities for which the endogamy level is stable, a variation in the level of ruggedness is not linked to alterations in the gender participation gap. Furthermore, in the online Appendix E we also relax the exclusion restriction assumption by following the approach developed by Nevo and Rosen (2012)[17]: results in terms of significance level and direction of coefficients are not affected. The validity of this and of the other four assumptions is fundamental in order to assign to 2SLS' estimated coefficients of *Entropy* and *FirstShare* the LATE interpretation and for the soundness of our identification strategy. It is important to remember that the 2SLS-LATE framework identifies an effect valid only for a subsample of observations, the so-called compliers: in other words, the subsample of municipalities for which the treatment effect is influenced by the instrument (Angrist and Imbens, 1995). In Section 7 we discuss more extensively which kinds of cities could be the drivers of our results

5. Main results

Moving to our empirical results, we first present the baseline OLS results, with the gender participation gap in 2001 as the dependent variable and *Entropy/Firstshare* as the main explanatory variables, including the set of controls we listed. Given the endogeneity con- cerns that we explained previously, we then move to the 2SLS regressions, instrumenting *Entropy/Firstshare* with average *Ruggedness*. We present the OLS results in Table 3.

As we can observe, the coefficients of both our proxies for endogamy are highly significant in all specifications, and their direction is as we theorized: municipalities with higher rates of in-marriage exhibit larger gender participation gaps. In fact, *Entropy*'s coefficients are negative, while *Firstshare*'s ones are positive in each specification, even with the inclusion of the large set of controls that we outlined previously. Coefficients for both endogamy proxies are characterized by a degree of volatility, especially after the inclusion of demographic controls and SLL fixed effects: this is due to the fact that some of the controls are linked to both labor market characteristics and marriage patterns[18]. Given the concerns for omitted variable bias and possible reverse causality, we turn next to 2SLS regression. We begin by presenting the first stage results on Table 4:

[15] Since we may speculate that more isolated communities have an older population with lower involvement in the labor market or education level, we control for the age structure of the municipality

[16] Regarding the potential bias coming from the importance of family values, we discuss it in the online Ap- pendix G, where we show how ruggedness is not linked to two different proxies of family values. Therefore, the exclusion restriction is preserved.

[17] Substantially, this approach replaces the exclusion restriction assumption in the IV framework with a less restrictive condition allowing some degree of correlation between the instrument and the endogenous variable: even in this case, the sign and magnitude of our treatment effect are not heavily affected.

[18] For instance, the variables most responsible for the change in magnitude of *Entropy* and *FirstShare*coefficients are the percentage of women graduated and the percentage of women with the diploma. Clearly, the decision to invest in education has potential effects on both the career and marriage decision of women. Also the extension of surface and the suitability for agriculture are responsible for a large change in the magnitude of our baseline coefficients, as these two variables are likewise potentially influencing both marriages and labor market patterns across communities.

Table 4
First stage 2SLS.

	First stage results					
Dependent Variable	Entropy	F.share	Entropy	F.share	Entropy	F.share
Avg ruggedness	-0.196***	0.716***	-0.166***	0.462***	-0.086***	0.254***
	(0.020)	(0.089)	(0.020)	(0.060)	(0.012)	(0.072)
Geographic controls	No	No	Yes	Yes	Yes	Yes
Demographic controls	No	No	No	No	Yes	Yes
SLL FE	No	No	No	No	Yes	Yes
Observations	7,726	7,726	7,726	7,726	7,726	7,726
Cragg-Donald F test	1246	809.8	422.3	291.9	151.2	65.4

Note: First stage regression in the 2SLS setting. The dependent variable is Entropy 1993 in the odd columns and First share in the even ones, while the explanatory variable of interest is average ruggedness. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Coefficients and standard errors have been multiplied by 100, to allow an easier understanding of the relationship between the instrument and our endogenous variables. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5
Effect of endogamy on gender participation gap - 2SLS.

	Dependent variable:					
	Participation gap 2001					
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Entropy 1993	-0.582		-1.749***		-1.488**	
	(0.562)		(0.620)		(0.716)	
First share 2004		0.160		0.628***		0.505**
		(0.150)		(0.227)		(0.231)
Geographic controls	No	No	Yes	Yes	Yes	Yes
Demographic controls	No	No	No	No	Yes	Yes
SLL Fixed Effects	No	No	No	No	Yes	Yes
Observations	7,726	7,726	7,726	7,726	7,726	7,726
R-squared	0.015	0.016	0.022	0.191	0.532	0.501

Note: Second stage regression in the 2SLS setting. The dependent variable is gender participation gap in 2001 (male labor force participation - female labor force participation), while the explanatory variables of interest are Entropy 1993 in the first case and First share 2004 in the second one. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

As we can observe from first-stage regression results, the effect of *Ruggedness* on our proxies for endogamy is coherent with what we theorized previously: a higher level of irreg- ularity of the municipality's surface contributes on average to increasing the social closure of its community. As a consequence, the effect of average *Ruggedness* is positive for *Firstshare* and negative for *Entropy*, in both cases shrinking the concentration of surnames. Next, we move to second stage results on Table 5, with the gender participation gap as our dependent variable:

As we can see, the effect of both *Entropy* and *Firstshare* is significant and coherent to our main argumentation that endogamy is positively linked to the gender gap in every specification apart from the first two columns. Coefficients present the same sign as OLS' ones but are larger in magnitude: the direction of the bias overcome by the instrumental variable strategy seems to be negative in the case of *First share* and positive in the case of *Entropy*. This is the opposite result that we would have expected to be generated by reverse causality: it might be due to the fact that there are some relevant omitted variables negatively linked to endogamy and positively linked to the gender participation gap, generating a bias in the opposite direction of the reverse causality's one[19].

However, the 2SLS coefficients still confirm our prediction about the positive relationship between in-marriage and the gender participation gap.

To give an idea of the magnitude of our 2SLS coefficients, if we standardized the variables we would see that:

- A standard deviation increase in *Entropy* is linked to a 0.32 standard deviation decrease in the gender participation gap
- A standard deviation increase in *Firstshare* corresponds to a 0.35 standard deviation increase in the gender participation gap

The standard deviation of the gender gap is 5.31, thus a 0.3 standard deviation change corresponds to roughly a 1.6% variation in this variable. To understand the size of potential shocks in endogamy, consider that the standard deviations of our two endogamy proxies are 3.51 for *FirstShare* and 1.10 for *Entropy*, while the two averages are respectively 3.82 and 5.35[20]. The gender participation gap reduction in the period 1971–2001 was on average 9.4% across Italian provinces: the potential effect of variations in endogamy on the gap reduction is therefore sizeable. In the period 2001–2011 the average reduction was 3.87%: therefore, a standard deviation change in endogamy has a potential effect that corresponds to almost half of 10 years' reduction in the gender

[19] For instance, immigration of men inside the municipality for job-related motives could have enlarged both the variety of surnames (thus, decreasing endogamy) and the gender participation gap.

[20] As we explain in Section 4, these two variables have extremely different density functions, being *FirstShare* more right-skewed.

gap in participation in the labor force. If the LATE assumptions we discuss in Section 4 and in the online Appendix C hold, we can state that higher endogamy rates raised the gender participation gap for the Italian municipalities for which ruggedness increased the frequency of in-marriage. We might even interpret these results in the following way: if we made parallelism between surnames and social norms, we provided evidence that not only the kind of culture matters in determining the gender gaps, but also its degree of homogeneity. The inclusion of all the controls we listed previously, as well as 686 "Sistemi Locali del Lavoro" fixed effects[21], does not decrease the magnitude or significance of *Entropy* and *FirstShare*'s point estimates [22][23]. Given that also in this 2SLS framework, coefficients are characterized by some volatility which might be caused by potentially bad controls, in Section 7.2 we offer a more "conservative" specification, by including only the most exogenous among the controls: results are still confirming the positive effect of endogamy intensity on the gender gap.

Even if we justified the choice to use the gender participation gap, and not female labor force participation, as an outcome for its stricter link with gender inequality, in the online Appendix K we show how larger endogamy is also causing lower participation of women in the labor force across Italian municipalities. In addition, coherently with our theoretical framework, in the online Appendices H-I, we show that municipalities with higher degrees of endogamy present also larger gender education gaps (difference between rates of men and women holding at least a diploma) and lower provision of public childcare (defined as the number of kindergarten places available every 100 children aged 0-2 years old). These results contribute to underlining how in those municipalities the role of woman is still central inside the house, leaving less time to invest in education or high-profile career jobs.

Since all the 2SLS results could be affected by the spatial autocorrelation issues described by Kelly (2019), in the online Appendix F we correct our standard errors for interdependence between neighboring municipalities: our main coefficients remain significant at the 10% level.

6. Discussion and channels' assessment

As we discussed in the previous section, the influence of endogamy rates on the wideness of the participation gap is noteworthy and deserves a further and in-depth analysis.

Indeed, our next step focuses on discussing the potential channels through which in-marriage discourages women from entering the labor force. As we pointed out in the introduction, our argument is that there might be two mechanisms through which higher rates of endogamy produce larger gender participation gaps: first, by preserving traditional social norms and thus the older gender roles, and secondly, by lowering the divorce probability for those women who married inside the community. Thus, we want to provide additional empirical evidence supporting the validity of these channels and assess whether data can confirm our predictions. We proceed as follows:

1 To verify the existence of the social norms' channel, we move back our analysis to a period in which divorces were not legal or anyway extremely unlikely: using data from a national survey of 1972 (Barnes, 1972), we assess the link between endogamy and female labor force participation. Indeed, divorce was introduced in Italy only in 1970 and it was subject to heavy criticism by the Catholic Church and the most traditional parties, leading to a (lost) referendum for divorce abrogation in 1974: therefore, we can assume that in 1972 the probability of a couple divorcing was negligible in the whole peninsula, as actual divorce numbers confirm[24]. Thus, when we assess the impact of endogamy rates on female labor supply in 1972, we would consider exclusively the social norms' effect and not the divorce channel.
2 To evaluate the probability of divorce channel, we compare municipalities' percent- ages of female divorced residents in 2001 and estimate whether rates of endogamy significantly increased marital stability across Italian municipalities.

6.1. Social norms' channel - 1972 survey

The survey was conducted in May and June 1972 (after the general elections on the 7th of May) on a sample of 1841 individuals which is representative at the national level.[25] Data were collected through face-to-face interviews conducted by Samuel Barnes and Giacomo Sani, two researchers from the "Inter-university Consortium for Political and Social Re- search". The interviews focused on respondents' political interest, behavior and attitudes, their party identification and organizational memberships, trust in government, reaction to the multi-party system, and views on left-right political differences. Demographic information about respondents included age, occupation, full-time work status, profession and political beliefs of the father. We focus on the 934 female respondents: the main dependent variable of this analysis is a dummy equal to 1 if the respondent is a housewife[26]. Among the 934 women in the sample, 57% declared to belong to this category (thus, not participating in the labor force). Since we have only information about the respondents' province of residence and not about the municipality, we would need a measure of the intensity of endogamy available for this level of disaggregation (NUTS 3 level). For this purpose, we choose the indicator of rates of consanguineous marriages in the period 1945-1964, available from the work of Cavalli-Sforza et al. (2004). This variable tells us about the percentages of marriages that were either between first cousins or between uncle/aunt and nephew/niece[27]. Those data were collected from the Vatican Archives: as a matter of fact, in Italy it is still necessary to have written authorization from the Catholic Church

[21] Thus, we are comparing municipalities within the same local labor market

[22] It seems that the controls most responsible for the increase in absolute value of *Entropy/First Share* coefficients are average elevation level, suitability for agriculture, gender unemployment gap and Roman Roads. As we discussed in the previous section, those variables are the controls that we implemented to prevent *Ruggedness* from having additional effects on our outcome, so they are more likely to remove any ulterior biases from the 2SLS coefficients.

[23] Even if contexts and variables are different, we can compare our work's results to similar ones in terms of magnitude: for instance, studying the effects of culture on second-generation immigrants in the US, Fernandez and Fogli (2009) find that a standard deviation increase in labor force participation in 1950 is associated with approximately a 7.5 percent increase in hours worked per week by women in 1970. Again for the US, Fern´andez and Wong (2014) found that an increase in divorce risk was responsible for over 42% of the LFP increase between the 1935 and the 1955 cohorts during the ages of 25-40 for married college women and 49% of the LFP increase for married high-school women. Moreover, studying the effects of having had a working mother because of World War II, Fern´andez et al. (2004) found that a 10 percent higher mobilization rate was associated with 3.3 additional weeks worked by women 45–50 years old in 1980.

[24] In 1972 there were 24000 divorced residents in Italy, corresponding to the 0,04% of the population.

[25] Individuals come from all 20 Italian regions. However, the sample is not representative at regional or municipality levels.

[26] The fact that a woman is a housewife might be dictated by a large variety of factors, and it might not have been her decision. We try to exclude the possible confounding factors by controlling for observables, and again by implementing our instrumental variable strategy.

[27] Ideally, we would have liked to aggregate *Entropy/FirstShare* at the province level. Our worry, in that case, is that a time gap of 30-40 years between this measure and our outcome would not allow us to correctly identify the effect of endogamy on female labor supply, since possible migration waves or heterogeneous fertility/mortality trends across cities could bias our results. However, if we nevertheless average the two endogamy proxies by province and look at their correlation coefficients with Consanguinity, we obtain a correlation score of -0.2428 with Entropy and 0.1212 with First Share. This additional piece of evidence confirms that all these three indicators are measuring the tendency to marry within the community.

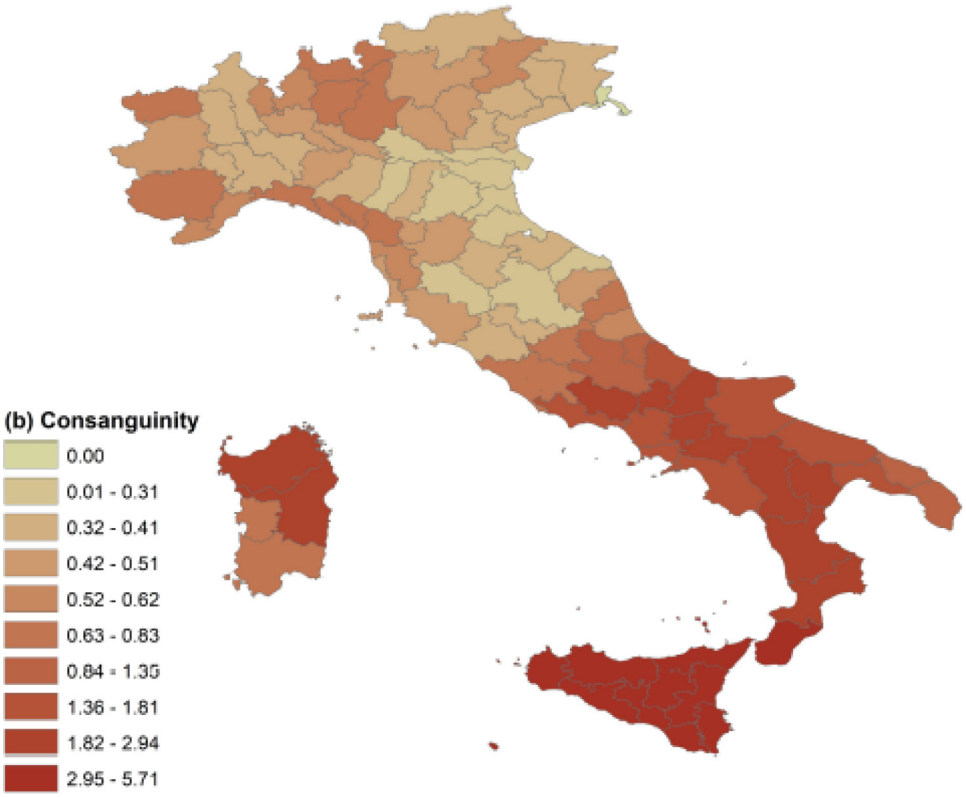


Fig. 6. Consanguinity rates 1945–1964.
Note: Rates of marriages celebrated either between first cousins or between uncle/aunt and niece/nephew over total marriages between 1945 and 1964. Cavalli-Sforza et al. (2004) collected those data from the Vatican Archives, which contain information about almost the totality of consanguineous marriages celebrated in Italy during that period. The image is taken from Akbari et al. (2019) and data include all 92 Italian provinces in 1964.

in the case that two individuals from the same family want to celebrate a religious marriage [28]. In Fig. 6, we can see a map of the frequency of consanguineous unions in Italy for the cited period.

Consanguinity rates are another convenient measure of endogamy intensity at the local level, proxying the extent to which marriage patterns in the provinces were circumscribed to local communities. This is our explanatory variable of interest, and we instrument it with the province's ruggedness level, as in our main regression. In substance, we want to evaluate whether the intensity of consanguineous marriages in the province of residence of the respondent is able to explain the probability that she does not work, i.e. that she is a housewife. We include also individual-level controls [29], together with province-level ones [30] to reduce the concern of omitted variable bias [31]. On Table 6, we can see both OLS and 2SLS results.

As we can observe, consanguinity rates are significantly increasing the probability of being a housewife in almost every specification, apart from the first one in the 2SLS frame- work. We argue that in this case, endogamy decreases female labor supply only through the preservation of social norms concerning the inappropriateness of working women. Indeed, the "probability of divorce" channel was practically non-existing in 1972: in this way, we are presenting supporting evidence to validate a first channel between endogamy and the gender participation gap.

An additional piece of evidence supporting this channel is included in the online Appendix J: in this case, we evaluate how consanguinity rates influenced the divorce referendum results. Indeed, if we follow our theoretical mechanisms, the more endogamous communities should have been more averse to the introduction of divorce, since it represented a threat to tradi- tional Catholic values and marriages' stability. Indeed, as we show in the online Appendix, Italians living in provinces with higher consanguinity rates were more inclined to vote for divorce abrogation.

6.2. *Probability of divorce channel*

Beyond the preservation and enforcement of gender norms, a custom of in-marriage decreases the probability of divorce among community couples, thus reducing incentives for wives to look for jobs. As a next step, we would like to test whether higher endogamous rates within a community can generate stronger marital stability, thus another channel explaining our main result. We choose to perform a 2SLS regression with the usual specification but using "Percentage of divorced female residents" as the dependent variable, defined as the percentage of resident women aged more than 15 that appear as being divorced in their legal status. This variable, obtained from the 2001 census, is a valid measure of marital instability: clearly, if more divorced women are resident in a municipality, it means that marriages are on average less stable and couples break up more frequently [32]. On Table 7, we can observe 2SLS results exposing the relationship between endogamy rates and divorced women.

Results from Table 7 show how communities with higher endogamy rates had on average fewer female divorced residents in 2001. Hence, data seem to confirm the existence of this second channel, with municipalities more prone to in-marriage exhibiting a lower probability of

[28] Data on the written authorizations from the Vatican Archives were publicly available only for the period 1945-1964.

[29] Size of municipality of residence, educational level, age, dummy for catholic, dummy for married

[30] Distance from the coast, elevation, suitability for agriculture, population in 1971, unemployment rate, ratio of civil versus religious marriages, surface size, population density

[31] We could consider some of the individual-level controls as bad controls, e.g. consanguinity might affect education level. However, our main results are stable when we include only pure demographics, as we see from Table 6.

[32] Heterogeneous frequencies of re-marriages within the population could produce measurement error since a divorced and re-married woman figures as "married" in the census. Unfortunately, we do not have data at the municipality level for second and third marriages, which were however quite uncommon before 2001, with frequencies around 6% of total marriages celebrated every year.

Table 6
Consanguinity rates and probability of being a housewife.

	Dependent variable:					
	Housewife					
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Consanguinity rates	0.046	−0.104	0.080	0.260	0.043	0.189
	(0.013)	(0.065)	(0.022)	(0.109)	(0.016)	(0.098)
Province controls	NO	NO	YES	YES	YES	YES
Individual controls	NO	NO	NO	NO	YES	YES
Observations	934	934	934	934	920	918
First stage F test		42.110		40.139		42.009

Note: OLS and 2SLS regressions with the dummy "Housewife" as dependent variable. The explanatory variable of interest is the consanguinity rate of the respondent's province of residence between 1945 and 1964. In the 2SLS setting, consanguinity rates are instrumented with the average ruggedness level of the province. Geographic and demographic controls at the province level are included in the specification. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 7
Endogamy and marital stability.

	Dependent variable:					
	Female divorced residents 2001					
	2SLS	*2SLS*	*2SLS*	*2SLS*	*2SLS*	*2SLS*
Entropy 1993	0.080*		0.401***		0.179**	
	(0.042)		(0.071)		(0.087)	
F.Share 2004		-0.022*		-0.119***		-0.065*
		(0.012)		(0.023)		(0.033)
Geographic controls	No	No	Yes	Yes	Yes	Yes
Demographic controls	No	No	No	No	Yes	Yes
SLL Fixed Effects	No	No	No	No	Yes	Yes
Observations	7,712	7,712	7,712	7,712	7,712	7,712
First stage F test	1249.02	815.80	394.91	182.73	237.76	52.31

Note: 2SLS regressions with the percentage of female divorced residents in 2001 (namely percentage of the female population resident in the municipality with "divorced" as legal status) as the dependent variable. The explanatory variables of interest are Entropy 1993 in the odd columns and First share 2004 in the even ones, both instrumented with the average ruggedness level of the municipality. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values, 378 observations have been dropped, out of the total 8090 municipalities. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

divorce, which in turn might have led to lower female labor force participation and a higher gender participation gap in 2001.

7. Robustness checks

7.1. Main result in subsamples

To provide some robustness to our main result, we check whether it is confirmed by an analysis across subsamples. To do so, we first evaluate the relationship between endogamy and the gender participation gap in subsamples including only Southern, Center or Northern municipalities, and afterward we verify the strength of our main result across subsamples based on municipalities' size and geographical characteristics. All these analyses together also provide an assessment of the extent to which our results can be considered valid for Italy as a whole, and not driven exclusively by particular subsamples of municipalities. In Table 8 we show the results from performing our main 2SLS regression on macro-areas subsamples (North-Center-South), together with the whole sample results (included to allow comparisons).

Looking at Table 8, we can clearly observe that our main result holds in significance level on two out of three subsamples of observations. The coefficients of the Southern subsample, while always keeping the same sign (*Entropy*-negative and *FirstShare*-positive) and similar magnitude with respect to the full sample's results, are less precise and not significant in explaining variations in gender participation gap[33]. With respect to the full sample's results, both magnitudes of coefficients and their standard errors are larger for the Northern and Center subsamples: thus, the results are less precise but still confirm the positive effect of endogamy on the outcome. It seems that Center-North municipalities are the main drivers of our results in terms of significance, even if these cities have slightly lower levels of participation gap with respect to the South, as we can observe from the table. This could be explained by the fact that having a higher and more variable ruggedness in the North allows our instrument to capture more variation in endogamy, making its statistical power stronger for this subsample of municipalities. However, the first stage F tests confirm that our in- strument is informative across all our three subsamples. Thus, even if ruggedness exhibits lower variation in the South and Center of Italy, it is still able to capture enough variations in endogamy to allow the implementation of our identification strategy. What we find by looking at these geographical subsamples

[33] The fact that these coefficients are not significant seems to be due to a lack of precision. Indeed, when we perform the same regressions on a subsample including both Center and Southern Italian municipalities, both *Entropy* and *FirstShare* coefficients become significant at the 1% level in explaining the gender participation gap.

Table 8
2SLS results over macro-regional subsamples.

	Dependent variable:							
	Participation gap 2001							
SUBSAMPLE	North	North	Center	Center	South	South	Whole	Whole
Entropy 1993	-1.830***		-2.403**		-0.352		-1.488**	
	(0.668)		(1.055)		(1.095)		(0.716)	
F.Share 2004		0.951***		0.554*		0.135		0.505**
		(0.320)		(0.293)		(0.418)		(0.231)
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SLL Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,878	3,878	1,329	1,329	2,519	2,519	7,726	7,726
Mean dep. variable	22.73	22.73	22.82	22.82	24.70	24.70	23.39	23.39
1st Stage CD Wald F-test	108.32	24.09	48.37	60.32	85.12	27.32	151.22	65.49
1st Stage KP Wald F-test	88.87	7.78	35.14	21.24	63.84	23.30	55.40	12.30

Note: 2SLS regressions over macro-regional subsamples: the first two columns include only Northern mu- nicipalities, the third and fourth columns include municipalities from Center Italy, while the fifth and sixth columns include Southern ones. The last two columns present the whole sample results, to allow an easier comparison. The dependent variable is the gender participation gap in 2001, while explanatory variables of interest are Entropy 1993 in the odd columns and First share 2004 in the even ones, both instrumented with the average ruggedness level of the municipality. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 9
2SLS results, cities and villages,

	Dependent variable:			
	Participation gap 2001			
Population	> 5*k*	> 5*k*	< 5*k*	< 5*k*
Entropy 1993	-1.716*		-3.633**	
	(0.936)		(1.843)	
F.Share 2004		0.802		0.787**
		(0.502)		(0.378)
Geographic controls	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes
SLL Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,329	2,329	5,397	5,397

Note: 2SLS regressions over subsamples with different municipality's size. In the first two columns, munici- palities' population is higher than 5000 inhabitants, while in the last two the population is lower than 5000 inhabitants. The dependent variable is the gender participation gap in 2001, while explanatory variables of interest are Entropy 1993 in the odd columns and First share 2004 in the even ones, both instrumented with the average ruggedness level of the municipality. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

is still in line with our major argument: higher levels of endogamy generate larger gender participation gaps across municipalities.

Furthermore, we might be concerned that our main result is not a direct consequence of endogamy, but it is driven exclusively by smaller Italian villages. In fact, one could argue that in a small village or town, both marriage and labor markets offer scarcer opportunities with respect to larger cities: as a consequence, one could observe both higher rates of in-marriage and a larger gender participation gap in villages, but this would not imply a causal link between them. Thus, on Table 9 we perform once again our main regression on two subsamples, the first time excluding small villages (identified as those with a population lower than 5000) and the second time focusing exclusively on them.

Our main result holds in significance and sign, however we can notice how the magnitude of *Entropy*'s effect is larger when we consider only villages. We have that for cities with more than 5000 inhabitants the effect is not significant when we use *FirstShare* as a proxy[34], but it is still in line in terms of magnitude and sign with the coefficient from the last column. Therefore, this robustness check confirms how our main result is not driven exclusively by small Italian villages: the link between endogamy and the gender participation gap regards also bigger cities.

An additional concern is that our main results are driven by cities in highly mountainous areas, and thus are not informative about Italy as a whole. To exclude this possibility, we perform our 2SLS regressions by focusing only on cities located in areas with an altitude lower than 300 m, which constitute 50% of our sample[35]. This subsample, therefore, excludes areas in highly mountainous areas, located in the Alps or Apennines. Table 10 shows these results, comparing them to the full sample ones.

As we can see from Table 10, the coefficients remain coherent in sign to our main results. Also coefficients' magnitudes are in line, and the significance level is preserved. Moreover, the instrument is informative also for municipalities in low-altitude areas, with high values of the first stage F tests. Thus, we demonstrated that our results are not driven exclusively by municipalities in Alps or Apennines, since results remain strong and significant also for areas in non-mountainous areas.

7.2. Conservative specification

The paper's main results, illustrated in Table 5, are characterized by a degree of volatility after the inclusion of geographic and demographic controls: it might be argued that some of these controls might be endogenous and then be bad controls. We explain in Page 22 the variables that are most responsible for the instability of the coefficients, which are mostly the demographic controls. As for the geographical controls, they are unlikely to be endogenous, but, nonetheless, they cause the baseline coefficients to vary. This is explained by the fact that variables such as the extension of the surface or the suitability of agriculture are correlated with Ruggedness, therefore their inclusion reduces the variability

[34] *P*-value is 1.6.
[35] The average altitude for the Alps is 1300 m, while for the Apennines is 800m, but this classification might change with respect to the areas considered.

Table 10
2SLS regressions - non mountainous areas.

	Dependent variable:			
	Participation gap 2001			
Altitude level	< 300m	< 300m	Full sample	Full sample
Entropy 1993	-2.474**		-1.488**	
	(1.246)		(0.716)	
First Share 2004		0.606**		0.505**
		(0.293)		(0.231)
Observations	4,007	4,007	7,726	7,726
R-squared	0.614	0.623	0.532	0.501
Cragg Donald Wald F test	33.40	57.75	151.2	65.50
KP Wald F test:	12.75	7.752	55.40	12.30
Geographic controls	Yes	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes	Yes
SLL Fixed Effects	Yes	Yes	Yes	Yes

Notes: Second stage regression in the 2SLS setting, subsamples divided with respect to the altitude level of the municipality's surface. The dependent variable is gender participation gap in 2001 (male labor force participation - female labor force participation), while the explanatory variables of interest are Entropy 1993 in the first case and First share 2004 in the second one. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 11
Effect of Endogamy on the Gender Participation Gap - 2SLS.

	Dependent variable:					
	Participation gap 2001					
Specification	Baseline	Baseline	Full	Full	Conservative	Conservative
Entropy 1993	-0.582		-1.488**		-0.720*	
First Share 2004	(0.562)	0.160	(0.716)	0.505**	(0.412)	0.229*
		(0.150)		(0.231)		(0.128)
Observations	7,726	7,726	7,726	7,726	7,726	7,726
R-squared	0.015	0.016	0.532	0.501	0.505	0.496
Geographic controls	NO	NO	YES	YES	YES*	YES*
Demographic controls	NO	NO	YES	YES	NO	NO
SLL FE	NO	NO	YES	YES	YES	YES

Note: Second stage regression in the 2SLS setting. The dependent variable is gender participation gap in 2001 (male labor force participation - female labor force participation), while the explanatory variables of interest are Entropy 1993 in the first case and First share 2004 in the second one. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
* Only the most exogenous Geographical controls have been included in the Conservative specifications

in endogamy that the instrument captures. However, we can show a more "conservative" specification of our model, where we include only the most exogenous controls, namely Dummy river, Dummy lake, Distance from the sea, Roman Roads dummy and Local Labor Market fixed effects. This "conservative" specification should overcome the concern about bad controls: in Table 11 we present the baseline regressions with no covariates, the full controls ones (same specification of the main results in Table 5) and the "conservative" specification.

As we can notice from Table 11, even in the most conservative specification, there is a significant effect of endogamy on the gender participation gap. Thus, if we net out the effects of the most exogenous geographic characteristics and within the same local labor market, variations in endogamy rates influence the size of the gender participation gap across Italian municipalities. The effect is still quite sizeable: in this conservative specification, a standard deviation increase in *Entropy* generates a 0.15 standard deviation decrease in the gender gap, while a standard deviation increase in *FirstShare* corresponds to a 0.16 standard deviation increase in the outcome.

7.3. Ruggedness and labor market characteristics

A recent paper by Boone and Wilse-Samson (2021) discusses the possible effects of ruggedness on labor market characteristics. According to these authors, the effects are concentrated on agriculture: more rugged areas are less suitable for mechanization and are characterized by less capital-intensive production. More sloped territories are unsuitable, for instance, for tractor use, and still need animals or humans in order to produce agricultural output. Therefore, we might think that since a more human-intensive production characterizes rugged territories, this might also affect the occupational choices of individuals, moving them to different sectors of the job market. This in turn could change the gender composition of the labor force, and thus constitute a direct channel through which ruggedness influences our outcome, violating the exclusion restriction assumption. To evaluate this possibility, we perform a series of OLS regressions with the percentages of employed in Agriculture, Industry and the Tertiary sector as main outcomes (number of occupied in the sector over the total number of occupied) and check their

Table 12
Effect of Ruggedness on labor market structure - OLS.

	Dependent variables:					
	Perc_agriculture	Perc_agriculture	Perc_industry	Perc_industry	Perc_tertiary	Perc_tertiary
Ruggedness	-0.003 (0.002)	-0.001	-0.002	-0.001	0.005**	0.002
		(0.001)	(0.003)	(0.002)	(0.002)	(0.002)
Observations	7,621	7,621	7,621	7,621	7,621	7,621
R-squared	0.004	0.663	0.001	0.793	0.008	0.744
Geographic controls	NO	YES	NO	YES	NO	YES
Demographic controls	NO	YES	NO	YES	NO	YES
SLL FE	NO	YES	NO	YES	NO	YES

Note: Standard OLS regressions. The dependent variables are the percentages of occupied in the three major labor market sectors. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 13
Effect of Ruggedness on income per capita - OLS.

	Dependent variable:		
	Income per capita		
Ruggedness	17.662***	2.747	4.983
	(4.400)	(5.649)	(12.408)
Observations	7,726	7,726	7,726
R-squared	0.002	0.008	0.058
Geographic controls	NO	YES	YES
Demographic controls	NO	NO	YES
SLL FE	NO	NO	YES

Note: Standard OLS regressions. The dependent variable is the declared income per capita of the munici- pality. Geographic and demographic controls at the municipality level are included in the specification, as well as "Sistema Locale del Lavoro" fixed effects. Due to missing values in the control variables, we dropped from the sample 364 out of 8090 Italian municipalities. Robust standard errors in parentheses are clustered at the province level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

correlations with Ruggedness: this analysis should expose any potential link between the instrument and the degree of industrialization or ruralization of the labor market. The results of these additional regressions are shown in Table 12.

We can observe from Table 12 that Ruggedness is uncorrelated with the percentages of occupied in the Agricultural, Industrial or Tertiary sector. There is exclusively a significant correlation with the percentage of individuals in the Tertiary sector, but it becomes insignificant after we include the controls: this means that, within the same Local Labor Market and with the same conditions in terms of the controlled characteristics, variations in Ruggedness are not significantly linked to variations in individuals occupied in the Tertiary sector. Overall, Table 12 suggests that Ruggedness is not influencing the structure of the labor market at the local level. We can add a further piece of evidence on this point, which is the correlation between Ruggedness and income per capita. Essentially, if there was a variation in the degree of industrialization/ruralization within the same local labor market which was correlated with Ruggedness, this should emerge from a regression with income per capita as the dependent variable and Ruggedness as one of the predictors. As we can observe from Table 13, there is no correlation.

In Table 13 we can observe how Ruggedness is not correlated to the income per capita across municipalities when we net out the effects of other geographical variables, and also when we include local labor market fixed effects and demographic variables. Thus, it seems that there are no additional effects, which we did not control for, of the asperity of the surface on the characteristics of the labor market in terms of industrialization or ruralization, and also on the level of economic development of the municipality. Therefore, we can be confident that this potential confounder, which would violate our exclusion restriction assumption, is not a source of bias for our results.

8. Conclusion

A persistent custom of endogamy, namely a community's inclination towards in-marriage, can produce significant socio-economic consequences, such as higher corruption (Akbari et al., 2019), lower impartial cooperation levels (Schulz et al., 2019) and lower women enfranchisement (Bahrami-Rad, 2021). We look here at the effects of endogamy on the gender participation gap in Italy, a country historically plagued by poor levels of women's participation in the labor force. We argue that one of the main sources of this kind of gender inequality, together with other factors, can be identified with persistent social norms stigmatizing working women. An important element that contributes to preserving and enforcing these kinds of norms within a community is its past intensity of in-marriage: by marrying "inside", a community shields its traditional gender roles and protects them from the influence of outer social norms. In addition, endogamous unions are characterized by higher marital stability with respect to exogamous ones, which translates into lower divorce rates: this gives wives less incentive to enter the labor market, since they do not feel the need to have an "outside option" in the case that the marriage ends. To prove the existence of a causal link between in-marriage rates and the gender participation gap across Italian municipalities, we made use of an IV strategy, by instrumenting endogamy intensity (proxied by the concentration of surnames within a municipality) with the level of ruggedness of the municipality's territory. We showed that the more intense in-marriage had been within a municipality, the larger its gender participation gap was in 2001. Moreover, we provided evidence that another proxy for endogamy, the province of residence's rate of consanguineous marriages, is increasing the probability of women not joining the labor force, according to a representative sample of Italian women from 1972. Furthermore, we demonstrated that the intensity of in-marriage across Italian municipalities is associated with lower female divorced residents in 2001, confirming the existence of a causal link between endogamy and marriage stability. Our robustness checks demonstrate that our results are not exclusive to specific areas of Italy, such as North, villages or the Alps/Apennines, but can be generalized to the whole country. Moreover, in the same robustness section, we show how the instrument that we use is not affecting the structure of the Italian labor market, and that the effect of endogamy on the Gender Gap is preserved also in a more "conservative" specification.

The analysis that we performed through this research sheds light on a so far neglected dy- namic contributing to generating and maintaining the large gender participation gap in Italy. The correct identification of the channels through which endogamy influences this gender inequality is fundamental for two reasons: first, to produce additional evidence

supporting our theoretical idea, and second, to provide possible policy suggestions to overcome this vi- cious circle. Indeed, the high persistence of conservative social norms in determining gender roles and women's decision to enter or not the labor force has been widely established by the literature (Fernandez and Fogli, 2009; Fern´andez, 2013; Bertrand et al., 2015): proving that endogamy contributes to social norms' persistence might help policymakers in taking effective measures in order to change them.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability

The authors do not have permission to share data.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.labeco.2023.102359.

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