The determinants of female labor supply in Italy, 1881-2018

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Abstract

This paper explores the determinants of female labor supply over the course of Italy's post-unification history (1881-2018). It uses a newly constructed adjusted series of female labor force participation, disaggregated by region and major sector of activity. The panel dimension of the data is exploited to identify the relative importance of competing factors driving the U-shaped trend of female labor supply over the course of Italy's modernization. We find that structural change (the reallocation of the workforce away from agriculture) plays a relevant, although not exclusive, role in the decreasing trend of female participation, but that the subsequent increase of female work is mostly due to within-industry changes, and not to the rise of the service sector. The current lag of Southern regions in terms of female labor force participation is the result of failed convergence in recent decades.

JEL codes: J16, J22, N34
Keywords: gender; female work; structural change; labor force participation; Italy; 1861-2018.

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1 Introduction

The history of women's changing economic role, and its connection with the forces of modern economic growth, has been a topic of research since the pioneering work of Ester Boserup (1970). Such a history requires long-run quantitative evidence on the segmentation of economic activities across gender lines, and its many dimensions: the extent of men's and women's involvement in "market production", the nature of activities carried out inside and outside the boundary of that definition, their remuneration, their distribution across demographic groups.

Working on the history of the US, Claudia Goldin has established that women's labor supply is U-shaped over the course of a country's modern economic growth (Goldin 1990, 1995). Evidence from Italian population censuses indicates that a similar U-shaped pattern is observed in Italy (Mancini 2018). However, there is no research on the relative importance of different supply- and demand-side factors in determining women's exclusion and subsequent re-entry into the labor force in Italy over the long run. Goldin and other scholars emphasize the role played by structural change in driving the process in the US (Goldin 2006, Ngai and Petrongolo 2017), and the role of a number of concurring causes has been studied (Albanesi and Olivetti 2016, Attanasio et al. 2008, Fernàndez 2013, Galor and Weil 1996, Goldin and Katz 2002, Greenwood et al. 2005). The interplay between these factors could contribute to explaining Italy's relatively weak position in international rankings of female participation to the workforce (OECD 2017a). The heterogeneity of gendered outcomes at the regional level (Costantini and Monni 2009, Bozzano 2014) adds a layer of complexity and interest to the study of these long-term trends.

This paper explores the determinants of the long-run trends of female labor supply, exploiting the time and cross-sectional variation of a panel of Italian regions observed over Italy's post-Unification history. The contribution it makes to the economic history literature is fourfold. First, it calls attention to a topic, that of the history of women's economic role in Italy, which has received separate attention by historians and economists, but has been neglected by economic historians, leading to the lack of a perspective that is both long-run and quantitative – if not for the seminal contribution by Bettio (1985;1988), which however predates much of the literature on structural change and female work, and was not, unfortunately, followed up by further research. Second, it constructs a new long-run series of female labor force participation, disaggregated at the regional level, which incorporates adjustments to tackle the measurement issues affecting most population census-based

measures of women's work (Humphries and Sarasùa 2012), and which is linked with modern labor force statistics. While several scholars have worked on producing a consistent series of the total labor force for Italy (Vitali 1970, Zamagni 1987, Fuà and Scuppa 1988, Rossi et al. 1993, Giordano and Zollino 2016, Daniele, Malanima and Ostuni 2018), none have focused specifically on women. The adjusted series supplements Vitali (1970) with evidence from the agricultural censuses (Federico and Martinelli 2015) and a correction for the industrial labor force (Fenoaltea 2003). Third, the paper documents the heterogeneous patterns of female labor supply across Italian regions, going one step forward with respect to previous studies, by disaggregating women's employment into major economic sectors and performing a shift-share analysis, that attributes changes in the female share of the workforce to changes in the structure of the economy and changes in the gender ratio within sectors. This provides insight into the role played by structural change in driving long-run trends in women's market work, relative to other factors. Fourth, the paper exploits the panel dimension of the data to further investigate the relationship between female labor supply, economic development and structural change, and the relative importance of other candidate explanations for the movements of working age women in and out of the labor force over the course of one and a half centuries.

The rest of the paper is organized as follows. Section 2 describes the construction of a new series of female labor force participation covering the period 1881-2018 in Italy and its regions. Section 3 analyzes long-run national and regional trends of female labor supply based on the new series. Section 4 focuses on determinants of these trends, based on panel regression. Section 5 concludes.

2 A new series of female labor force participation in Italian regions: sources and methods

All attempts to measure female work in a consistent way over the long run are complicated by serious difficulties, and Italy is no exception. These issues are examined at length in Mancini (2018), but are also summarized below, because some of the solutions adopted for this paper update that previous work. I organize measurement issues into three types: internal consistency of the series, consistency with a modern benchmark, and gender bias in the measurement of work activities. The first two affect the measurement of the whole workforce, regardless of gender, while the third one relates to women's work specifically.

First, there is the issue labelled *internal consistency*. As for many other countries, Italy's population censuses are the one source that continually recorded counts of the workforce (that is, counts of the resident population by "professional condition" or occupation) over one and a half centuries, since the country's unification in 1861. However, many of the criteria underlying these enumerations have changed over time, in ways that are sometimes easy to pin down (classification of occupations, treatment of religious and military personnel, age ranges for which the questions on economic activity were asked, changes in regional boundaries), and other times subtle (inconsistencies that stem from changing beliefs about what qualified as "professional condition", beliefs that were rarely spelled out in introductory remarks and notes to the published figures, especially in the early censuses). As a result, data points in the census-based series of labor force participation are, in general, not comparable with each other in the absence of adjustments.

Secondly, long-run measures of female work must tackle the issue of *consistency with a modern benchmark*. Usually, the goal for long-run reconstructions of economic indicators is to retain consistency with the modern definition of that indicator, to allow for intertemporal comparisons. Until as recently as 1981, the Italian census definition of labor force was not consistent with the modern ILO standard (Istat 2011a), which in turn was only established in 1947 by the 6th International Conference of Labour Statisticians (ILO 2018). Frequencies of reported occupations form the basis of the census measure of labor force before then: the resulting figure hinges on the notion of an individual's habitual work status, their "trade", rather than on whether or not they performed a set of objectively defined actions at one point in time (*i.e.* performed any work, or actively looked for work, during a short time frame before the interview), as is for the modern labor force definition. The two concepts overlap, but are not the same: the occupation-based, pre-modern

construct may either overstate or understate the modern definition, depending on whether an individual's declared occupation was closely tied to their actual status at the moment of the interview (which may have not been the case for highly seasonal, irregular or informal jobs; Goldin 1990: 219-221). So, not only is the census-based definition of labor force a moving target, given its changes from one survey to the next; it is also, in its essence, different from the modern concept that constitutes the ideal benchmark.

Finally, and maybe most importantly, there is extensive documentation of the fact that, in many countries and for long periods of time, population censuses have used a double standard in counting male and female workers, which has resulted in the systematic underestimation of the female workforce (Humphries and Sarasùa, 2012). This phenomenon should not be confused with feminist critiques of the modern concept of labor force, which are ultimately aimed at the definition of production underlying the System of National Accounts: by refusing to assign any value to the production of goods and services not exchanged on the market – such as subsistence production, unpaid care work, etc., activities that were and are disproportionally carried out by women – the SNA production boundary ends up erasing women's contribution to the wellbeing of the household and to the economy in general (Benerìa 1981, Waring 1988, Hoskyns and Rai 2007). This argument calls into question the very foundation of the concepts of production and labor, and the debate around it is important; however, it remains in the background of this paper. The bias affecting census-based measures of women's work is a consequence of this larger issue, but is of a more empirical nature, and consists in the fact that "even by *accepted* definitions of labor force, there has been a tendency to underestimate female labor force participation rates" (Benerìa 1992, emphasis mine): population censuses in many countries erased women's work even when it fulfilled the standard applied to men, either because of its more intermittent nature and vicinity to other "non-work" activities performed in the home, or because of preconceived notions of a woman's "proper" role, which affected both the perceptions of census enumerators and those of female respondents themselves, and caused women to be counted as "housewives" even when their work status was not far from that of comparable men.

An overview of these issues for the Italian case is offered in Patriarca (1998): the consensus is that female work was indeed underreported, especially in agriculture, and especially in censuses from 1901 to 1931: women that contributed to the family enterprise with activities that would, in all likelihood, amount to employment by today's standards, were given the label of "housewives", "dependents" or "without occupation". The specific case of Italy is,

however, characterized by an additional measurement issue related to women's work, which scholars of Italian economic history know well: counts of female manufacturing workers from the early post-Unification censuses are unreliable, because they include women working in the domestic production of textiles for the family's own-consumption (who, it is argued, are not part of the labor force), although this only happens in some regions, namely the Southern ones, and not others (Calabria has become notorious in the literature discussing the issue, starting with Vitali 1970: 32-34; among the many contributions that followed, Zamagni 1987; Fenoaltea 2003, 2004; Ciccarelli and Missiaia 2012). In conclusion, the measurement of female work in Italian censuses is affected by the same type of underreporting bias that is documented for other countries, and also by a specific issue of inconsistent enumeration of manufacturing workers, that is heterogeneous across regions and over time.

Clearly, a consistent long-run series of female labor force participation must address all three general issues outlined above. The adjustment proposed here tackles them as follows.

The issue of internal consistency of the series has received the most attention in the Italian economic history literature, beginning with Vitali (1968, 1970), who harmonized Italian census-based labor force estimates since 1881, and produced a labor force series by sector of activity, region and gender, consistent with the definition adopted in the 1961 census. The reconstructions that followed have typically incorporated Vitali's work, updating it in various ways (Vitali 1970, Zamagni 1987, Fuà and Scuppa 1988, Rossi et al. 1993, Giordano and Zollino 2016). Mancini (2018) provides an updated and critical review of these adjustments. The series presented here is no exception, in that it uses Vitali as its foundation for the years 1881-1961. The 1861 and 1871 censuses have long been considered problematic by the literature, although more recently, scholars have become less critical of at least the 1871 figures (Daniele, Malanima and Ostuni 2018). These authors are not interested in the gender breakdown of the workforce, however: because demography and sector composition by gender are crucial for the purposes of this paper, the 1861 and 1871 censuses are not deemed suitable for the analysis presented here, and are excluded.

For years 1971-onwards, one is faced with the trade-off between sticking to census estimates of the labor force, and favoring the internal consistency of the series, or turning to Italy's Labor Force Survey (Rilevazione sulle Forze di Lavoro, RFL), and favoring consistency with modern analyses of the labor market. This trade-off leads naturally to the

question of consistency of the census-based series with the modern definition of labor force. Ideally, an estimate of the difference between labor force counts obtained via the two definitions could be obtained by comparing series based on the two different definitions, over a period of overlap. The RFL was started in the mid-1950s, therefore there is a time window in which two different definitions and data collection methods – historical and modern – were both operational. However, RFL figures are unreliable before 1977: the Italian National Statistical Institute offers a back-recalculation of the RFL-based labor force series only up to that year, and before then, there are multiple conflicting reconstructions. After the 1970s, the population census questions dealing with labor status were changed to fit ILO standards (Istat 2011a), so that, starting in 1981, the differences between census and RFL series become small. These circumstances rule out the possibility of comparing the two definitions directly.[1] However, they also facilitate the choice between the two alternatives, given that there is no way to achieve perfect consistency of the series throughout the whole period, and therefore no strong reason to sacrifice consistency with current standards. In light of these considerations, the present reconstruction uses raw census figures for 1971 (because reliable RFL figures are not yet available), while for 1981-2011, the choice is to privilege consistency with modern labor market analyses, and use RFL figures.[2]

No adjustment is made for the change of the lower age limit for the working-age population, which is 10 years and over for the Vitali series, while it is 14 years and over for 1971-1991, and 15 years and over for 2001-2011. As shown in Toniolo and Vecchi (2007), the labor force participation of children aged 10 to 14 declined rapidly in Italy after WWII, going down to 3.6% in 1961: adding an estimate of the number of working children to the figures from recent censuses is unlikely to have a significant impact on the series.

Finally, the issue of the biased counts of women workers in Italian population censuses is arguably the most relevant for the purposes of the present paper. Not only is it important that the size of the female workforce be correctly measured in order to produce a

[1] Working on the US censuses, Claudia Goldin concludes, on the basis of alternative sources on the distribution of days worked per year, that the historical ("gainful worker") definition of labor force and the modern one would not produce very different estimates of the female labor force around the beginning of the 20th century (Goldin 1990: 219-221).

[2] Years 1981 and 1991 are sourced from the publications reporting RFL yearly averages, which include regional breakdowns of labor force and employment figures (Istat 1985, 1993); years 2001 and 2011 are from Istat's online data warehouse.

meaningful description of long-run trends and regional heterogeneity; a correct breakdown of female employment into sectors of activity is crucial as well, given that the purpose of this work is to explore determinants of secular trends in female work, and structural change is one of the main candidates.

Vitali (1968) attempted a correction of the underreporting of female work, inflating the number of female agricultural workers based on informed conjectures. The adjustment proposed here is a further inflation of the female agricultural labor force for the period 1881-1936, based on evidence from the 1930 census of agriculture, as reconstructed by Federico and Martinelli (2015).[3] Regarding the issue of female textile workers, domestic manufacturing for the sole purpose of producing goods for the family's own consumption is excluded from the current definition of labor according to the ILO (although this is a recent development: see ILO 2013) so that the figures for manufacturing in the early censuses require an adjustment to allow correct intertemporal comparisons. Even more serious is the threat that the unadjusted figures pose to cross-regional comparisons, given that criteria for counting outworkers were heterogeneous across areas of the country. The adjustment implemented here follows Fenoaltea (2003) in capping the number of female textile workers at four for each male. It is a simple yet well-reasoned criterion, which sidesteps the more complex adjustment proposed by Zamagni (1987), on the basis of the limitations of industrial censuses (Fenoaltea 2014).

The series of labor force participation for men is constructed in a similar way as the one for women, but without the over- and underreporting adjustments (it uses Vitali for years 1881-1961, the raw census figures for 1971, and the RFL figures for 1981-2011). Appendix A compares the census-based series to the RFL (Rilevazione sulle Forze di Lavoro, modern Labor Force Statistics) series.

[3] Evidence from both the 1930 agricultural census and from historical household budgets collected around the same period indicates that Vitali's correction is insufficient in 1931. Regional multipliers are computed to further inflate Vitali's estimates of the female agricultural labor force to the level implied by the agricultural census. These regional multipliers are then applied to all other years over the period 1881-1936. See Mancini (2018) for further details.

3 National and regional trends of female labor force participation, 1881-2011

3.1 The shape of female labor supply in the long run

Figure 1 shows the series of female and male labor force participation in Italian regions over almost 150 years (solid lines), compared with the national average (dotted lines). A few stylized facts emerge. First, men's labor supply, which provides a benchmark for the female series, has declined steadily over Italy's post-unification history (the national figure falls from 90% in 1881 to about 60% at the end of the period), and this decline displays a low variation across regions. This is consistent with evidence from the history of other countries: as higher education has become more widespread and retirement has begun to occur earlier, the length of the average working life has shortened, and participation rates among men have gradually declined. Men's labor supply has low variability in cross-sections of countries as well (Blau, Ferber and Winkler 2016).

Second, the U-shape of female labor supply described by Goldin (1990, 1995) is clearly visible in the national series, and in most regions. Consequently, the gender gap in participation, which is a measure of the gender-based polarization of "market" and "non-market" productive activities, while present (almost) everywhere throughout the period, tends to be smaller at the turn of the 19th century, then gradually widens, before beginning to close again only a few decades ago, after 1971. Again, international evidence shows that this non-monotonicity is a common feature of secular trends of female labor supply (Mammen and Paxson 2000, Luci 2009, Lundberg 2010, Olivetti 2014).

However, and this is the third message of Figure 1, the female series is much more heterogeneous across regions than the male series. The U is more accentuated in the North, while some Southern regions, like Puglia and Basilicata, display almost monotonically declining trends, due to a strikingly weak expansion of women's work after the 1960s. An almost N-shaped pattern emerges in other regions of the Italian Mezzogiorno, most notably Calabria, due to an increase of female work in agriculture that occurs before 1921 (which might be a consequence of the emigration of male members of agricultural families).[4]

[4] Other regions in the South experience a similar phenomenon, but the effect of an expanding female workforce in agriculture is masked by a declining number of manufacturing workers. For Calabria,

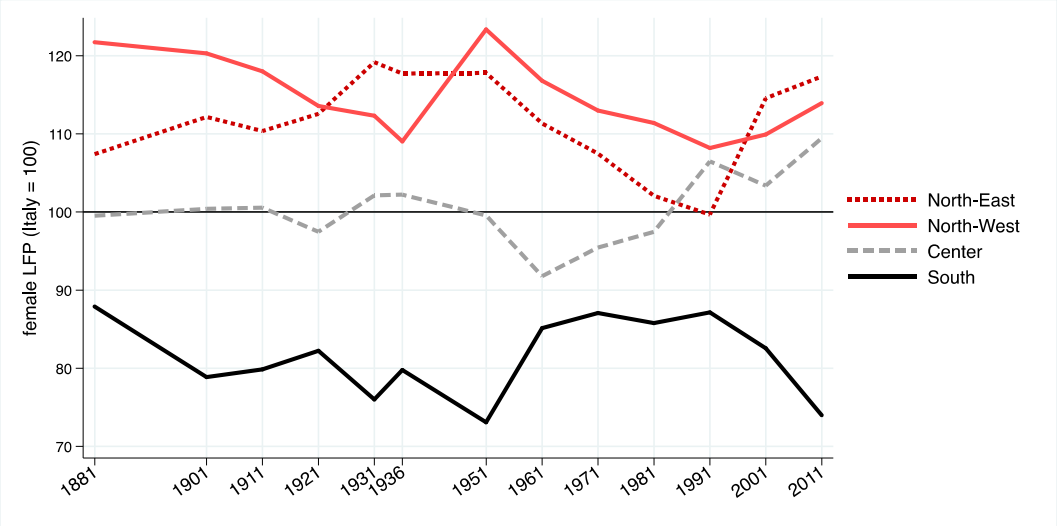
Figure 1. The evolution of labor supply gender gaps in Italian regions: female and male labor force participation (%)

Note: Working-age population is 10 years and over for 1881-1961, then 15 years and over.

the size of the manufacturing workforce is small compared to agriculture, after correcting for the enumeration of female textile workers. More details in Section 3.2.

Figure 2 focuses on the regional convergence of female labor force participation rates, displaying macro-area specific rates as a proportion of the national average. Not much happens before WWII in terms of regional convergence or divergence. The distance dividing the North as a whole from the Center and South of Italy remained relatively stable before 1951, with Southern regions at the bottom in terms of female participation; the only notable "action" is detected within the Northern area: in the North-West, where industrialization first took off (in the so-called "industrial triangle"), female labor force declined faster than in the North-East. Things change after 1951: convergence does occur, but it is fleeting (essentially limited to the 1950s) for the South, while the Center regions eventually catch up with the North. After 1961, convergence of the South stopped and even reversed (a pattern similar to that of GDP per capita after World War 2: Felice and Vecchi 2015). The current North-South gap in female labor force participation is a result of this failed convergence in recent decades.

Figure 2. Female labor force participation by macro-area, Italy = 100

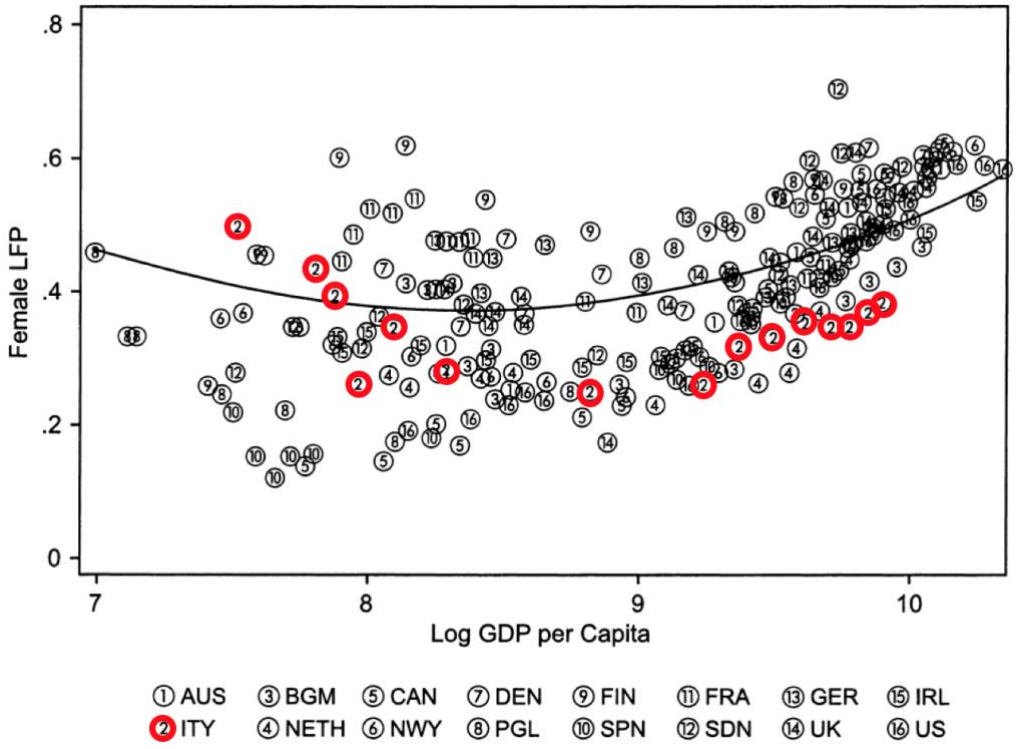


Note: Working-age population is 10 years and over for 1881-1961, then 15 years and over.

Figure 3 draws a comparison between Italy and the time series of female labor force participation in 16 other countries, using data assembled by Olivetti (2014). The prevalence of female work is compared across countries at similar levels of GDP per capita, because different countries travelled through the U-shape at different times, according to the timing and pace of modernization. What emerges from this comparison in terms of convergence is similar to the message of Figure 2: Italy's current position seems to be due to a failure to

catch up to the rate reached by most other countries during recent phases of economic development.

Figure 3. Female labor force participation and per capita GDP across countries, 1890-2005



Source: Figure 5.2 in Olivetti (2014).

These considerations suggest that the history of women's work in Italy shares some traits with trends observed in other countries (namely, the general U-shape), but also that a more complex story hides behind the national average. The causes and implications of these different patterns can only be understood by taking a closer look at the composition of the workforce.

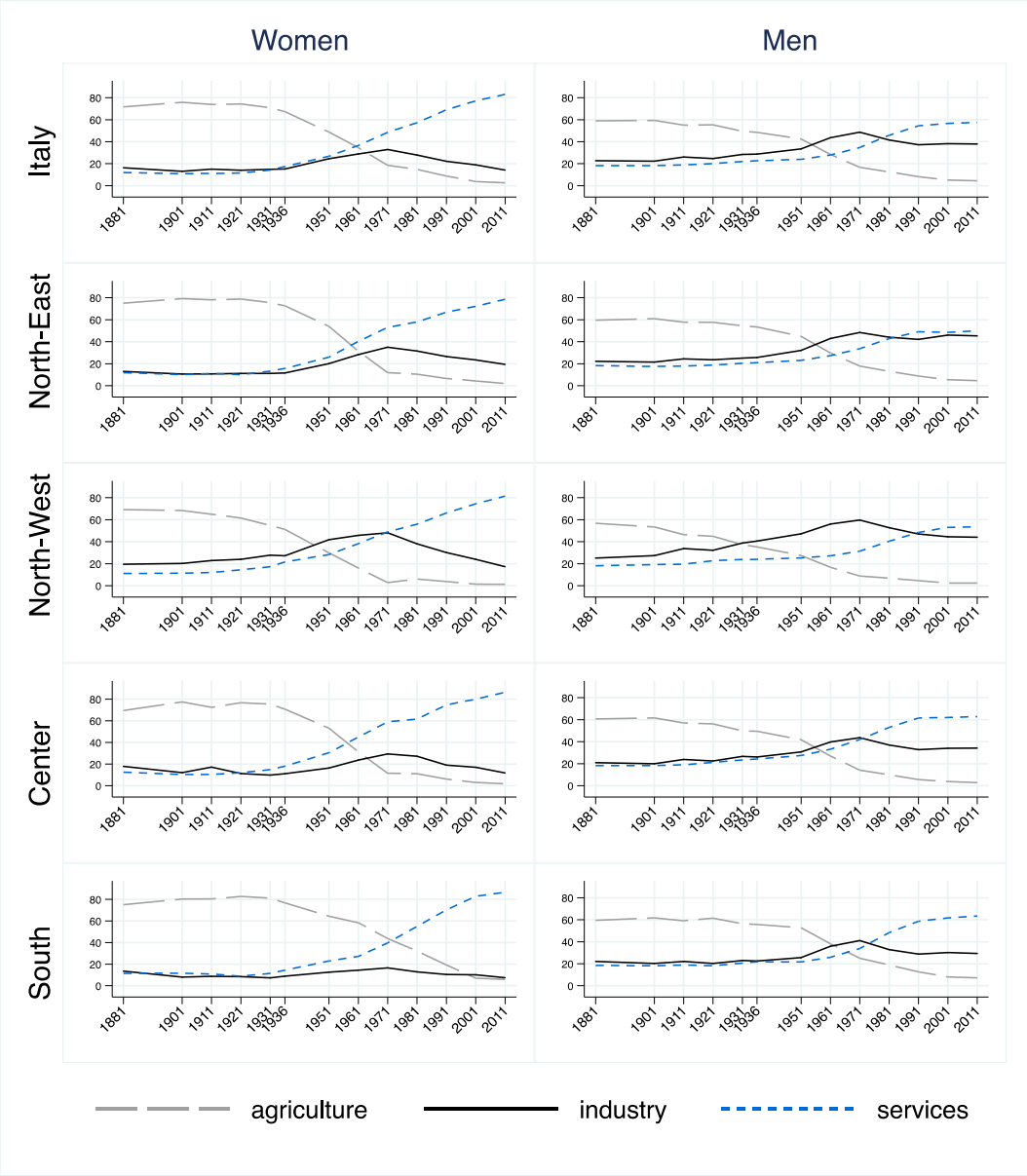
3.2 Structural change and the female workforce

The interaction of traditional gender roles with the process of structural change that accompanies modern economic growth is seen as one of the main mechanisms behind the U-shaped trend of female labor supply. The argument first formalized by Goldin (1990, 1995) can be summarized as follows. Women's involvement in the conventionally measured labor force is high in pre-industrial times, when the majority of the population is employed in agriculture, and when goods production activities can be performed in proximity with tasks that were automatically assigned to females, such as the care of

children and the upkeep of the house. Industrialization and urbanization generate a new labor market, to which men supply labor, while (adult, married) women retreat to "inactivity" (that is, to activities that are not included in the production boundary). This happens because of a strong income effect on female labor supply; women's preferences are, in turn, shaped by gender norms that prioritize women's role as mothers and homemakers, and stigmatize their market work (especially in blue-collar jobs). The eventual rise of the service sector generates jobs that are seen as more "acceptable" for women, and that better remunerate gender-neutral characteristics, in which women have a comparative advantage (brain versus brawn). At the same time, women catch up with men in terms of human capital, thanks to diminishing gender gaps in education. These phenomena pull women back into the workforce, and equalize the division of tasks across genders.

Figure 4 shows changes over time of the allocation of workers across the three major branches of the economy, by gender, in Italy and in its macro-areas. The general picture that emerges from the graphs is consistent with Goldin's interpretation, and with stylized facts emerging from the international evidence (Olivetti 2014): over the course of Italy's economic growth, the share of women working in agriculture relative to the total female workforce decreased faster than the corresponding share of men; the share of women working in services increased faster than the corresponding share of men; and the share of women working in manufacturing remained flatter than the corresponding share of men. In other words, as the agricultural sector shrank, working-age men moved to manufacturing, while women moved out of the workforce, into unpaid "home production". Of course, regional variation is a well-known defining feature of the Italian case: the areas that are closer to the simplified description laid out above are the North-East and Center; in the South, women's industrial employment remained consistently very low, but the agricultural sector declined more slowly than in the rest of the country; in the industrial North-West, the female workforce was more involved than elsewhere in the manufacturing sector, although not enough to match the dynamics of the male workforce.

Figure 4. Number of women (men) employed in agriculture, industry and services as a share of total working women (men) (%), by macro-area



In order to describe the shifts of the workforce between and within sectors more systematically, I perform a standard shift-share analysis (Olivetti and Petrongolo 2016; Ngai and Petrongolo 2017). The proportion of women in the workforce can be expressed as:

$$l_f = \sum_s l_s \cdot l_{fs} \qquad (1)$$

where $l_f = {}^{L_f}/_{L}$ the share of female workers out of the total workforce; $l_s = {}^{L_s}/_{L}$ the share of people employed in sector s out of the total workforce (sector share of s); and $l_{fs} = {}^{L_{fs}}/_{L_s}$ the share of females employed in sector s out of the total number of workers employed in sector s (female intensity in sector s).

Take time differences of (1) between t=0 and t=1, which are denoted by Δ:

$$\Delta l_f = \sum_s \alpha_{fs}\, \Delta l_s + \sum_s \alpha_s \Delta\, l_{fs} \qquad (2)$$

where $\alpha_{fs} = \frac{l_{fs}^1 + l_{fs}^0}{2}$ and $\alpha_s = \frac{l_s^1 + l_s^0}{2}$ are decomposition weigths. The first term on the r.h.s. of (2) is the effect of changes in the sector composition of the economy, keeping the proportion of male and female workers within each sector constant ("between component"); the second term is the effect of changes in the female intensity of the workforce of each sector, keeping the overall composition of sectors in the economy constant ("within component"). The between component can be interpreted as the effect of structural change; the within component reflects a variety of other factors that affect the gender composition of the workforce, but not the industry structure, such as skill-biased technological change (Toniolo and Vecchi 2007), or changing gender discrimination and gender norms (Ngai and Petrongolo 2017).

Table 1 presents descriptive statistics of sector shares and female intensity at the beginning and end of the period under consideration (1881 and 2011), and at the minimum of female labor supply (which for most regions is 1961). In terms of sectoral composition, the country is not polarized at the beginning of the period (Felice 2017); however, female intensity in agriculture is higher in the North, and lower in the Center and South. In 1961, divergence in structural change becomes visible, with the sharp increase of the industry share in the North-West, while female intensity decreases in all sectors (except for a slight increase in services in the North). In 2011, services are predominant everywhere in terms of sectoral composition, but more so in the Center and South, because of the smaller industrial sector; however, female intensity is services is much lower in the South than elsewhere. One conclusion is immediately apparent: while the role of structural change may well explain the general dynamic of female labor supply over time – especially its decreasing trait – it does not help to make sense of current regional differences in labor force participation. Women's low labor force participation in the Italian South is reflected in the low female intensity of the service sector, not in its share in the economy.

Table 1. Sector shares and female intensity by macro-area, selected years

		sector shares			female intensity		
		1881	1961	2011	1881	1961	2011
Italy	Agriculture	64.3	30.0	3.7	46.6	30.2	29.4
	Industry	20.1	39.8	28.3	34.1	19.1	20.7
	Services	15.7	30.2	68.0	31.8	31.8	50.0
North-East	Agriculture	66.2	30.2	3.5	49.0	28.7	24.7
	Industry	18.2	38.9	34.2	30.9	20.1	24.6
	Services	15.5	30.9	62.4	33.1	35.9	54.6
North-West	Agriculture	62.6	16.5	1.9	51.4	28.0	28.6
	Industry	22.5	53.1	32.6	40.4	24.9	22.9
	Services	14.9	30.4	65.5	34.8	36.4	53.6
Center	Agriculture	64.3	28.0	2.4	43.9	27.5	32.0
	Industry	19.7	35.8	24.6	36.9	16.3	20.5
	Services	16.0	36.1	72.9	31.9	30.7	50.8
South	Agriculture	65.6	43.1	6.7	45.1	32.6	30.9
	Industry	18.7	30.8	21.7	28.5	11.3	12.2
	Services	15.7	26.2	71.6	28.7	25.0	42.7

Results of the shift-share decomposition based on the three major sectors are shown in Figure 5.[5] In general, changes in female intensity play a significant role in the decomposition, both before and after 1961. However, looking at the national results, structural change accounts half or more of the total change in the female share of the workforce in all periods before 1961, except for 1911-1921 and 1931-1951 (the latter is the largest observed change, although the longer time span must be taken into account). This pattern is weaker in the South, where the effect of changes in female intensity always prevails over the reallocation of the workforce between sectors. The direction of the effect of female intensity is not consistent across regions.

[5] The three-way sector breakdown captures the foundational elements of Goldin's interpretation of the dynamic of female labor supply; results do not change significantly even when we consider 10 sectors instead of just 3 (for now, this sensitivity check has only been performed over years 1881-1961, see Appendix B).

Figure 5. Shift-share decomposition, consecutive census years (1881-2011)

The interpretation of the periods in which the female share of total workforce increased is more straightforward, and more uniform across Italy's regions. Changes in both industry structure and female intensity give a consistently positive contribution, and the latter component prevails in all periods and across all areas. Although they establish that on average, across high-income countries, structural change accounts for about half of the post-1970 increase in female work, Olivetti and Petrongolo (2016) document that in Southern Europe, as well as in the US and Canada (although the timing of structural change

for the two groups of countries is very different, and comparing them over the same time period may be misleading), it is the component due to female intensity that holds more weight.

The evidence points to factors other than structural change that have contributed to the observed changes of female labor supply in Italy over time, and certainly to the differences observed today across areas of the country.

4 Exploring the determinants of long-run trends of female labor supply in Italy

Modern studies emphasize potential own wage, marital status, partner's income, number and age of children, and human capital as the main factors influencing women's labor supply decision (see Blau, Ferber, and Winkler 2014, chap. 6 for a review). When it comes to explaining historical trends, a number of demand- and supply-side factors have been examined. As mentioned in Section 3, one of the most often-cited mechanisms is structural change, and, more generally, economic growth, which has both supply and demand components (Olivetti and Petrongolo 2016: 419); but the literature has also explored the role of secular changes acting on labor supply, such as accumulating human capital (Goldin 2006), medical progress (Goldin and Katz 2002, Albanesi and Olivetti 2016), declining fertility (Galor and Weil 1996; Attanasio et al. 2008), labor-saving technological progress shocking productivity in home production (Greenwood et al. 2005), changing social norms (Fernàndez 2013). Overall, the literature focuses on the postwar increase in female labor supply, rather than on longer-run trends. Granted, drivers of female participation may change significantly as we go back in time: "while some explanatory variables might appear universal, not all of them time travel" (Humphries and Sarasùa 2012), and the endogeneity of many of the above-cited factors (such as family formation and investments in human capital) to employment opportunities has to be acknowledged.

In the context of Italy, the amount of regional variation at any given time in both the outcome of interest – female labor supply – and in local economic conditions, as well as in other potential correlates of female work, suggests to exploit the panel dimension of the data to further investigate the relationship between female labor supply, economic development and structural change, and other concurrent factors that are likely to have influenced the movements of working-age women in and out of the labor force. Such an approach cannot make causal claims: it is merely exploratory, but can point to other factors

that correlate to the dynamics of female labor supply in Italian regions beyond structural change, which, as Section 3 suggests, may fail to explain much of the observed variation of female work both over time and across regions, especially in postwar period.

As a first step, I replicate a test commonly performed by the literature that uses panels of countries to study the link between economic development and female work. Economic growth is typically proxied with per capita GDP, and its relationship with female labor supply is modelled as a quadratic trend – that is, female labor force participation is regressed against log GDP per capita and its square. Country fixed effects, time dummies and lags of the dependent variable are usually included to control for unobserved country-specific heterogeneity, common shocks, and persistence of the variable of interest (Goldin 1995, Mammen and Paxson 2000, Lincove 2008, Luci 2009, Tam 2011, Olivetti 2014, Gaddis and Klasen 2017). We can see this as a test of the U-shapedness of the relationship between economic growth and female participation. Applying this procedure to the panel of Italian regions yields results that are similar to those produced by the cross-country literature, confirming that GDP and female participation are linked by a negative and convex relationship in Italy, even when unobserved regional heterogeneity is accounted for.[6] The magnitude of estimated coefficients for GDP, in particular of the negative main effect, is larger than comparable cross-country estimates, indicating that in Italy, overall, female work fell more with GDP than in groups of comparable countries (see in particular Olivetti 2014, who uses a panel of sixteen OECD countries over the period 1890-2005).[7]

This simple approach can be augmented by adding time-varying covariates to describe other processes operating alongside GDP growth, and affecting the prevalence of female work. It should be stressed once again that endogeneity and model misspecification cannot be ruled out in this context; they can, however, be mitigated by controlling for as many relevant factors as possible, and by including region-specific fixed effects. Moreover, unobservable time-varying heterogeneity (changes in attitudes and cultural institutions affecting women's labor supply choices, for instance) is likely to be less of a threat to

[6] The source for regional GDP per capita is Felice (2017). Detailed results are shown in Appendix C.

[7] Results of this exercise also highlight the fact that including year effects in the specification, as most cross-country studies do, strips the effect of GDP of any significance. Trying to identify economic growth separately from common time trends is problematic in this context, where observations are regions within a single country (however poorly integrated Italy may be). Year effects are not included in the rest of the paper.

identification when the data refer to regions within a single country, rather than to different countries.

Naturally, the specification of the model is constrained by data availability: not all controls one might wish for are available as time series that are consistently measured over almost 150 years, and disaggregated at the regional level, so that sometimes it is necessary to resort to proxies, and other times little can be done but to exclude the variable. Keeping that in mind, covariates have been assembled in an attempt to capture the main candidate determinants of the long-run dynamics of female labor supply. First, economic growth and structural change: as mentioned above, log GDP per capita is often treated as a catch-all proxy of modernization and structural transformation; however, including a measure of industry structure, in addition to economic growth, may refine the way these phenomena are captured. Besides, this allows to test whether the contribution of a shrinking agriculture, or of an expanding service sector, contribute significantly to the shifts of female labor supply over time. I compute sector shares of value added for the three major sectors from Felice (2017), and add the agriculture share and the service share to the specification, alongside log GDP per capita.

Second, human capital: narrowing gender gaps in education are one of the most often cited factors contributing to the increased supply and demand of female work; Goldin (1995) and Olivetti (2014) have included the log of male minus female years of schooling to the basic model. For the case of Italy, a long time series of gross enrolment rates disaggregated by gender and region exists for primary education only (A'Hearn and Vecchi 2017), but that is likely to have little explanatory power in recent decades. As a second best, I use estimated mean years of schooling for the population of both genders, from Felice and Vasta (2012): the variable fails to measure female disadvantage relative to males, but is a proxy for the level of female education, insofar as male and female education are correlated.

Third, demographics and family formation: fertility declines are expected to decrease the burden of family responsibilities weighing on women, and thus increase their labor supply (Attanasio et al. 2008); marriage patterns (which could be described by family size and mean age at marriage) have also been connected to the enforcement and transmission of social norms regarding gender roles, and linked to a number of gendered outcomes (Bertocchi and Bozzano 2016). Mean age at marriage is available as a consistently constructed time series in Livi Bacci (1977), but no such series is readily available for the

modern period, to the author's knowledge. This control has therefore been omitted, although it is potentially important in capturing not only nuptiality patterns, but also the relative frequency of married and unmarried women in the population (the latter group has typically higher rates of labor force participation). In order to capture the effect of care responsibilities within the family, the dependency ratio (the population younger than 15 and older than 64 as a proportion of the population aged between 15 and 64) has been included, as well as the average household size (before 1971, Cinnirella, Toniolo and Vecchi 2017; 1971-2011 Istat online data warehouse).

Fourth, emigration has been a distinctive feature of Italy's history, and has at times caused changes in the demographic composition of specific areas so dramatic as to prompt descriptions of the "disappearance" of the adult male population, and of the consequences of this on women's involvement in traditionally male tasks, by contemporary observers (Gomellini, Ò Gràda and Vecchi 2017). To control for localized effects of emigration on the labor market, the gross emigration rate (that is, the number of emigrants per 1000 residents; Istat 2011a) is added as a control. Because data on the number of returnees is only available starting in 1905 (Istat 2011a), it was not possible to construct a measure of the net emigration rate. Migration may affect women's work through the substitution of migrants' labor, but also through the flow of remittances, which would have an income effect decreasing women's work: the sign of the net effect is therefore not predictable a priori.

Finally, infant mortality (Atella, Francisci and Vecchi 2017) is included to proxy for the state of maternal health, and for medical progress related to childbirth and the care of very young children, which are expected to have had a positive impact on the secular trend of female participation.

All of the variables cited above, not only GDP per capita, are likely to affect female work nonlinearly over time. In fact, variables that are relevant in a given sub-period may be inconsequential in another, or even display no variation at all, which makes them impossible to control for in this context. This is the case, for instance, of childcare and family policies, which are important for determining female work in recent times (Del Boca and Giraldo 2013 cites them as the key to the slow growth of female employment in Italy after the Second World War) but did not exist for the whole period under consideration. Rather than imposing a parametrization of time-varying effects, I use interactions with time trends to model nonlinearities. Given the small number of observations in our panel of

Italian regions, a parsimonious specification has been employed, where instead of interacting each regressor with all twelve years under consideration, I divide Italy's post-Unification history into three conventional periods (the Liberal period, 1881-1911; the Interwar years, 1921-1931; and the postwar years, 1951-2011), and use those in interactions with regressors. This sacrifices the flexibility of the specification for the sake of efficiency.

Region fixed effects are included after the Hausman for the equivalence between fixed and random effects rejects the null hypothesis (chi2 = 288.61, p = 0): Table 2 presents estimates based on the within estimator.

Table 2. Panel estimates of determinants of female labor force participation, 1881-2011

	Dependent variable: female LFP (%)	
	Coef.	Std. Err.
constant	-103.80**	(37.46)
period*lngdp		
1881-1911	8.22	(5.00)
1921-1931	5.15	(4.38)
1951-2011	10.00**	(2.57)
period*agriculture share of VA		
1881-1911	-0.01	(0.20)
1921-1931	0.40*	(0.17)
1951-2011	0.32*	(0.13)
period*service share of VA		
1881-1911	0.12	(0.30)
1921-1931	0.29	(0.21)
1951-2011	0.05	(0.17)
period*mean years schooling		
1881-1911	3.15	(2.95)
1921-1931	8.08*	(3.04)
1951-2011	2.82**	(0.83)
period*dependency ratio		
1881-1911	0.31	(0.24)
1921-1931	0.40	(0.23)
1951-2011	0.07	(0.15)
period*household hsize		
1881-1911	5.13	(3.24)
1921-1931	5.53	(3.49)
1951-2011	2.65	(3.16)
period*emigration rate		
1881-1911	0.35	(0.17)
1921-1931	1.78**	(0.57)
1951-2011	-0.02	(0.24)
period*infant mortality		
1881-1911	0.25***	(0.06)
1921-1931	0.04	(0.06)
1951-2011	0.10	(0.09)
region fixed effects	included	
N	206	
R-sq	0.879	

Note: Robust standard errors in parentheses, clustered at the region level.
* p<0.05, ** p<0.01, *** p<0.001.
Sources: Female LFP: author's elaboration, see Section 2 for sources and methods. GDP and value added by sector: Felice (2017). Mean years of schooling: Felice and Vasta (2012). Gross emigration rate: Istat (2011a). Infant mortality: Atella, Francisci and Vecchi (2017).

In this specification, the effect of GDP growth is only significant in the postwar period, and is positive. Of the other two variables describing structural change, only agriculture emerges as significant, although not in the Liberal period. The positive and significant coefficient in the postwar period is due to the Miracle years, when agricultural value added is rapidly shrinking, and female labor force participation is on the decline. Overall, we can

conclude that beginning in 1921, a decrease in the share of agriculture is significantly associated to a decrease in female labor participation. Structural change per se, at least as captured by the model, seems to only be relevant for what concerns the decreasing portion of female participation. The transformative effect of the "rise of the service sector" (Ngai and Petrongolo 2016) does not emerge from the evidence presented here.

One puzzling result is the large and significant effect of education in the Interwar and postwar years. While primary gross enrolment rates had been on the rise since Italy's Unification, secondary and post-secondary education only became widespread during recent decades (A'Hearn and Vecchi, 2017); it is plausible that accumulating human capital favored women's employment, but it is not clear why the effect should have been stronger in the Interwar decades. It is possible that the variable is picking up the effect of unobservable time-varying phenomena that are positively correlated with both education and female work.

The coefficients of dependency ratio and household size are not significant. The expectation would be to find a negative and decreasing effect for dependency (the burden of family responsibilities pulls women out of the workforce, but it becomes less taxing with the gradual reallocation of care tasks to the state and the market), and possibly a positive effect for household size (picking up economies of scale in larger families). Either changes in family formation and dependency do not matter for long-run trends of female work in Italy, or the proxies included here do not do a good job in capturing these phenomena.

Finally, migration and infant mortality emerge with significant effects in specific periods: migration is positively associated during the Interwar years, while infant mortality has a small but highly significant positive impact in the Liberal period. The first effect may point to substitutions between working-age household members during a period which saw strong constraints imposed over the free movement of people; the second effect may be capturing more complex differences in wellbeing, and possibly strong income effects pushing all members of poor families into the workforce, regardless of gender, when living conditions are poor.

In conclusion, preliminary panel evidence confirms that structural change does not have a strong effect of on the long-run dynamics of women's employment in Italy: the effect of the reallocation of the labor force away from agriculture is significant, although not large, and the growth of the service sector does not have a strong enough impact on recent developments to emerge as significant. Other factors with significant coefficients do not

seem to provide alternative explanations for the slow growth of female work in Italy, and especially in the South, in recent years: estimating a different model, limited to the postwar years, would allow to refine the choice of controls and possibly provide a better description of the mechanisms at work.[8]

5 Conclusions

The story of how the division of labor across genders has changed over Italy's 150-year history is told – even if imperfectly and partially – by many of the same sources that Italian economic history has depended upon time and time again: population, industrial and agricultural censuses. Yet, so far, the long-run trends of female labor supply have only been discussed in passing, as an aside for narratives focused elsewhere (Mancini 2018). This paper has put forth a new reconstruction of Italian women's labor force participation since 1881, disaggregated by region; and has produced some preliminary results that explain its dynamics.

The new regional series has confirmed, after adjusting for the measurement issues that often impede the correct identification of trends in female work, that when measured consistently with modern standards, the trend of women's labor force participation is U-shaped over the course of Italy's history and along the path of its economic growth. This is a pattern that Italy shares with other countries. Overall, the gender gap in participation has *increased* steadily and reached its peak during the 1950s and 1960s. The implications of this simple fact are striking: the convergence of the economic roles of men and women is a rather exceptional development following a long history of divergence, in which there has been a trade-off between economic growth and the equality of gender roles – at least in the admittedly crude, but relevant metric of labor force participation.[9]

[8] Refinements to the empirical strategy include the estimation of a dynamic spatial panel data model accounting simultaneously for serial dynamics, spatial dependence and common factors, also known as weak and strong cross-sectional dependence (Vega and Elhorst 2016, Ciccarelli and Elhorst 2017), although the methodology is demanding in terms of sample size; and the use of a pooled mean group estimator (Pesaran 1999).

[9] Labor force participation measures a single dimension of gender inequality, one that was admittedly much less relevant in pre-industrial societies than it is in modern ones (as the boundaries between "market" and "non-market" work were blurred before industrialization). Widespread female work in a prevalently agricultural society should not be taken as an indicator of great gender equality, but rather as a sign that productive tasks were not as polarized along gender lines. Still, this polarization is and has been relevant to women's lives, insofar as the ability to perform "market" work gives women more status, more bargaining power within the family, more freedom of choice.

The trade-off manifests in all regions, but there are distinctions to be made, as expected for a country, such as Italy, characterized by limited economic integration. Women's involvement in the labor force has always been considerably lower in Southern regions, and higher in the North (with the possible exception of Liguria and Veneto), as is the case today. However, taking a long-run view reveals how the current lag of Southern regions with respect to the rest of the country is the result of a failed convergence in recent decades. It is the "modern" part of the story, the increasing trait of the U, that differentiates the dynamics of female work across regions the most: in some cases – Campania, Puglia, Basilicata, Calabria – the postwar increase in female participation is so weak as to be hardly detectable when one takes a century-long view. This "failed convergence" has a parallel in the international comparison of Italy's history to that of other countries (Olivetti 2014). Female labor supply falls and then rises for most countries; if there is an "Italian peculiarity", it is in the final portion of the trend, in the weakness of the convergence of Italian women's involvement in the labor force to the level prevailing in other countries.

In an effort to explain the stylized facts described above, the paper has examined the role of structural change, which the literature cites as the main mechanism through which the trade-off between economic growth and equal production roles is realized (when, during industrialization, women's work is reallocated from agriculture to "inactivity", while men's work shifts to manufacturing) and later reversed (as the rising service sector absorbs a more highly educated female workforce). The evidence that emerges from a shift-share decomposition of the changes of the share of female workers suggests that structural change plays a relevant, although not exclusive, role in the decreasing trend of female participation, but that its impact is limited when it comes to explaining its subsequent increase, most of which is due to within-industry changes. North-South differences in participation are certainly not due to the size of the service sector (which, if anything, is larger in the South). This points to the relative importance of other factors, acting beside or even against structural change in determining the relatively flat trend of female participation in Italy (an especially in its Southern regions) in recent decades.

As a first step toward a more complete understanding of the forces at play, the panel dimension of the regional series has been put to use, by estimating a fixed effects model of female participation which includes proxies of the main factors affecting female labor supply in the long run, whose effects are allowed to vary nonlinearly with time. The limitations of this approach are great, and difficult to overcome, for issues of data availability. Panel evidence confirms the significance of changes in the agriculture share

of value added in explaining the over-time and cross-regional variation in female participation, and the insignificance of changes in the sector share. However, it does not seem to suggest alternative explanations, although it may help to rule some of them out (in particular, human capital and demographic changes). The historical context uncovered by this work provides a strong motivation for renewed efforts in researching Italy's postwar history, given how consequential it seems to have been; but it also calls attention to an underresearched past, when the forces of Kuznets' "modern economic growth" may have failed to show their benevolent face – at least in some ways – to a large part of the population.

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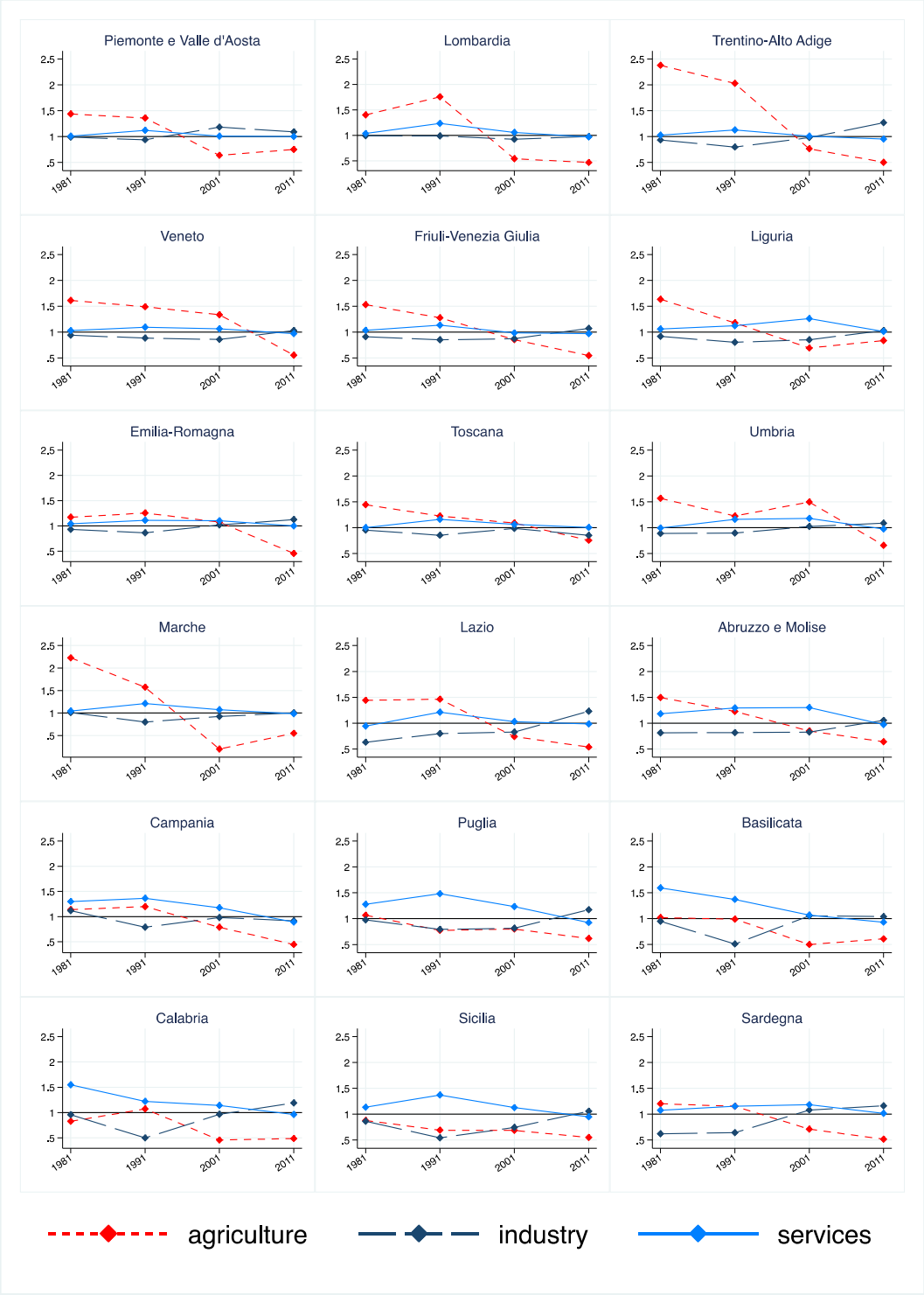
Statistical Appendix

A. Number of employed women by sector: comparison between population census and Rilevazione sulle Forze di Lavoro (ratio RFL/census)

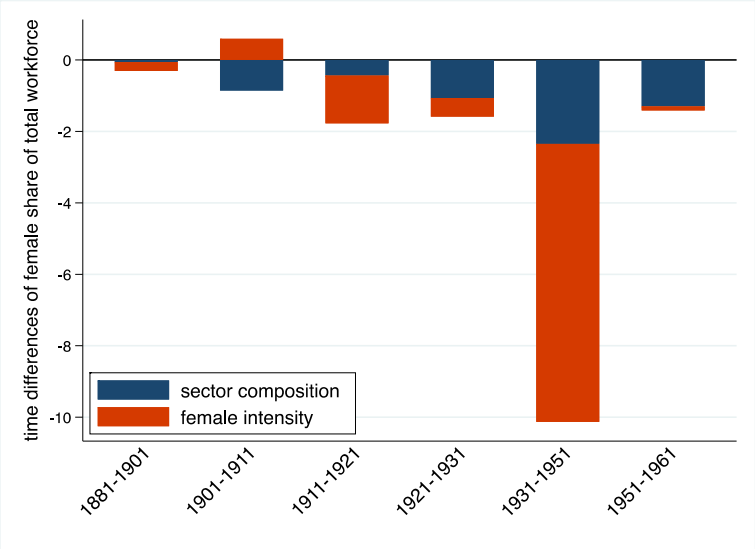


B. Shift-share decomposition

Table D.1. Detailed results on time differences in sector shares and female intensity

Area	Period	Δ female share in total workforce	between-component	within-component	Δ sector share agriculture	Δ sector share industry	Δ sector share services	Δ female intensity agriculture	Δ female intensity industry	Δ female intensity services
North	1881_1901	0.0	0.0	0.0	-0.2	0.3	-0.1	1.0	-1.9	-1.5
North	1901_1911	-0.9	-0.8	-0.2	-4.2	3.6	0.7	0.7	-2.8	0.3
North	1911_1921	-2.0	-0.3	-1.7	-1.4	-0.3	1.7	-2.2	-0.1	-2.5
North	1921_1931	-1.2	-1.1	-0.1	-5.8	3.6	2.2	0.0	-1.9	2.1
North	1931_1951	-9.6	-1.9	-7.7	-15.8	10.2	5.7	-15.7	-3.2	1.4
North	1951_1961	-2.8	-0.3	-2.5	-14.6	9.0	5.6	-5.8	-3.7	3.0
North	1961_1971	-4.0	0.8	-4.8	-11.0	4.9	6.0	-12.6	-3.4	-3.0
North	1971_1981	9.6	1.4	8.2	-2.3	-7.5	9.8	14.5	7.4	7.7
North	1981_1991	3.5	1.3	2.2	-3.0	-5.7	8.7	2.2	0.5	3.5
North	1991_2001	3.8	0.9	3.0	-2.5	-2.5	5.1	1.5	-0.6	5.3
North	2001_2011	1.7	1.0	0.7	-0.7	-3.0	3.7	-7.6	-3.6	3.5
Center	1881_1901	-0.1	0.5	-0.6	3.8	-2.9	-0.8	2.2	-7.6	-4.0
Center	1901_1911	0.3	-0.7	1.0	-4.7	4.3	0.4	0.5	3.9	-0.5
Center	1911_1921	-2.0	0.1	-2.2	0.9	-3.0	2.1	-0.3	-9.3	-0.9
Center	1921_1931	-0.9	-1.1	0.1	-4.8	2.1	2.7	1.6	-5.7	1.4
Center	1931_1951	-10.4	-2.4	-8.0	-14.5	6.5	8.0	-15.5	-1.5	1.7
Center	1951_1961	-2.3	-1.1	-1.2	-17.1	8.9	8.2	-4.9	-0.5	2.3
Center	1961_1971	0.8	0.4	0.3	-14.4	4.4	9.9	-5.4	2.7	1.0
Center	1971_1981	5.4	0.9	4.5	-3.2	-6.1	9.3	11.5	6.1	1.6
Center	1981_1991	5.2	0.9	4.4	-4.5	-6.1	10.6	4.9	-0.1	6.5
Center	1991_2001	4.1	0.3	3.8	-2.4	-0.6	3.0	-3.6	0.5	5.7
Center	2001_2011	2.4	0.8	1.5	-1.1	-2.6	3.6	-2.9	-4.9	4.1
South-Islands	1881_1901	-2.9	0.6	-3.5	2.9	-2.9	0.0	-2.3	-9.8	-1.8
South-Islands	1901_1911	0.1	-0.4	0.5	-1.6	1.4	0.2	1.2	-0.1	-2.1
South-Islands	1911_1921	-1.4	0.5	-1.9	2.1	-1.1	-1.0	-1.8	-0.3	-4.0
South-Islands	1921_1931	-3.1	-1.0	-2.0	-4.6	1.9	2.8	-1.7	-5.2	-0.1
South-Islands	1931_1951	-9.9	-1.4	-8.5	-9.0	4.7	4.3	-14.7	-0.8	2.4
South-Islands	1951_1961	2.1	-1.6	3.7	-12.4	8.0	4.5	6.8	-1.1	2.7
South-Islands	1961_1971	0.6	-1.7	2.3	-13.2	4.3	9.0	4.0	0.5	2.1
South-Islands	1971_1981	2.4	0.6	1.8	-7.2	-7.6	14.8	2.3	1.0	2.0
South-Islands	1981_1991	1.3	0.1	1.1	-8.0	-3.8	11.8	-1.1	-0.1	2.4
South-Islands	1991_2001	4.3	0.1	4.2	-6.8	0.1	6.8	-8.1	1.4	7.3
South-Islands	2001_2011	2.4	0.7	1.8	-1.0	-1.9	2.9	1.1	-1.9	3.0
Italy	**1881_1901**	-0.3	0.3	-0.6	1.9	-1.6	-0.4	0.9	-4.7	-2.0
Italy	**1901_1911**	-0.3	-0.6	0.4	-3.4	3.0	0.4	0.9	-0.6	-0.6
Italy	**1911_1921**	-1.8	0.0	-1.8	0.0	-1.0	1.0	-1.8	-1.7	-1.9
Italy	**1921_1931**	-1.6	-1.0	-0.6	-5.2	2.9	2.3	-0.1	-2.9	0.9
Italy	**1931_1951**	-10.1	-1.7	-8.4	-13.3	7.6	5.7	-16.0	-2.3	1.7
Italy	**1951_1961**	-1.1	-0.8	-0.3	-14.4	8.7	5.7	-0.3	-2.8	2.8
Italy	**1961_1971**	0.4	-0.2	0.6	-12.7	4.7	8.0	-1.1	0.9	1.4
Italy	**1971_1981**	4.5	1.1	3.5	-3.9	-7.1	11.0	6.2	3.6	2.4
Italy	**1981_1991**	3.2	0.9	2.3	-4.9	-5.2	10.1	0.8	0.3	3.8
Italy	**1991_2001**	4.1	0.6	3.5	-3.8	-1.3	5.1	-4.1	0.0	6.1
Italy	**2001_2011**	2.2	0.8	1.3	-0.9	-2.5	3.4	-2.6	-3.3	3.7

Table D.2. 10-industry decomposition (1881-1961)



C. Quadratic specification of GDP per capita, Italian regions 1881-2011

	Dependent variable: female LFP (%)		
	1	2	3
constant	977.6***	941.6***	111.2
	(125.2)	(118)	(151.2)
ln GDP	-203.5***	-193.9***	1.046
	(27.88)	(26.17)	(34.33)
ln GDP^2	10.92***	10.30***	-0.947
	(1.543)	(1.437)	(1.914)
Region fixed effects	no	yes	yes
Time effects	no	no	yes
N	214	214	214
R-sq	0.434	0.588	0.847

Note: Robust standard errors in parentheses, clustered at the region level.
* p<0.05, ** p<0.01, *** p<0.001.
Sources: Female LFP: author's elaboration, see Section 2 for sources and methods. GDP from Felice (2017).