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ABSTRACT

Can Economic Pressure Overcome Social Norms? The Case of Female Labor Force Participation*

We investigate the potential channels that drive female labor force participation to rise in response to unbalanced sex ratios, in the presence of strong social norms against female employment. One such channel is women's desired labor supply, operating through the marriage market, and the other is employers' demand for female labor. If faced with a reduction in male workforce, do employers turn to women to fill in the gap? Do women enter traditionally male occupations and industries, so that segregation decreases? Does the gender pay gap decline? We exploit exogenous variation in sex ratios across cohorts and regions, by using instruments based on casualties from the Portuguese Colonial War and massive emigration in the 1960s combined with its historical regional patterns. We find that as the sex ratio declined, female participation increased, women entered traditionally male-dominated occupations and industries, and the gender pay gap declined. These findings are consistent with a demand shock. Our estimated impact of sex ratios on marriage market points to a muted supply channel. We complement the quantitative analysis with an archival case. Our findings help to explain an apparent puzzle, a decades-long high female participation in Portugal, as opposed to the other Southern European countries.

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1 Introduction

Social norms influence the integration of women into the labor market, in such a way that under negative views on gender equality: women work less for the market (Blau et al., 2013; Fernández and Fogli, 2009; Fortin, 2005; Antecol, 2000); or they work, but are less likely to get married, as Bertrand et al. (2016) have shown for the highly educated; or they work and get married, but refrain from earning at their potential, if it is above their husbands' (Bertrand et al., 2015); in alternative, they work, get married, and earn at their potential even if it is above their husbands', but are more likely to get divorced (Bertrand et al., 2015). There is also evidence that gendered views perpetuate occupational segregation (Pan, 2015; Cortes and Pan, 2018). However, economic forces may threaten the sustainability of such social norms and this interaction calls for research: "How are gender identity norms evolving in the face of market forces that are making those norms increasingly costly?" (Bertrand et al., 2015, p. 612). We address a related question: Can economic forces overcome social norms? We document the mechanisms that led Portugal, in the context of a fiercely conservative society and legal setting, to leap ahead in the world ranking of female labor force participation (FLFP), over the 1960s and early 1970s. We contribute to the literature on the sources of rising female participation by shifting the dominant perspective of analysis. Indeed, research so far has placed emphasis on desired labor supply, highlighting the role of the marriage market and intra-household bargaining, fertility, female investment in education, or social interactions. It certainly generated valuable insights into the mechanisms operating to bring women into the labor market, and it derived far-reaching policy implications. Yet, there is another side to the market, which has attracted less attention: the demand side. Our goal is to scrutinize the potential role of employers in shaping the rise in female participation. To document the impact of demand forces, we inspect several labor market outcomes beyond female participation, namely: gender segregation across occupations and industries; and the gender pay gap.

In the early 1960s, social norms in Portugal and Spain undoubtedly curtailed women's rights and participation, in tune with the countries' policies on citizenship, voting rights, marriage, divorce, contraception, and abortion. Accordingly, their FLFP

rates, at approximately 17%, lagged behind most other OECD economies (World Bank, 2018). However, over the 1960s and 1970s, Portugal experienced a substantial increase in its female participation rate, so sharp that by 1980 it was indeed second only to the Nordic countries, the US, and Canada. The pace of growth in the Portuguese FLFP over that period was comparable only to Norway's. As a result, a clear outlier emerged among Southern European countries, with a striking contrast between the Portuguese social and legal norms, on the one hand, and its rate of female participation, on the other hand. The timing of this early rise in FLFP coincided with a major military draft to fight the war in the African colonies against pro-independence movements and massive emigration of males.

We show that the massive male emigration unintentionally improved labor market conditions for women, hastening a transition into the labor market that was delayed for a couple of decades in neighboring Spain. We exploit exogenous variation in population sex ratios across cohorts and regions, driven by war casualties and historical emigration patterns, to investigate the implications of gender imbalances for several labor market outcomes. To do so, we combine micro-census data from Portugal starting in 1981 with micro-census data for France starting in the late 1960s, as well as Portuguese historical birth statistics by region and gender, and historical emigration statistics by region. Additionally, we rely on individual-level information on Portuguese fatal war casualties in Africa from 1961 to 1974. Moreover, we use very rich longitudinal linked employer-employee data, starting in the mid-1980s, which cover the population of firms and workers in the private sector of the economy, reporting very fine classifications of occupations and industries, detailed wages, and hours of work. We also provide comparisons with Spain, using micro-census data from Spain, France, Germany, and Switzerland, together with Spanish historical birth and emigration statistics. Our quantitative analysis is complemented with an archival case study. The salt evaporation ponds of Alcochete (*salinas de Alcochete*) were Portugal's largest salt production center during part of the 20th century. Overturning a centuries-long tradition, women first joined its workforce in the 1960s. The archival material used combines the national census of the sector undertaken in 1954-1960, the archives of two major employers in the salt extraction sector containing exhaustive and systematic monthly records of their labor force, together with information from independent sources interviewed.

We first highlight two key findings on Portugal: the declining sex ratio had a significant positive impact on female participation and a minimal impact on female marriage rates. The latter result can be easily rationalized. We document that the men who emigrated were mostly married and left their wives behind, hence marriage rates did not reflect the local relative scarcity of males. The limited role of the marriage market provides preliminary evidence of a reduced impact of labor supply forces driving the rise in female participation. We proceed to scrutiny of the potential role of demand forces, by looking at other outcomes of female integration into the labor market. We provide extensive evidence of occupational upgrading, of the reduction of gender segregation across occupations and industries, and of a gender pay gap narrowing, in response to the decline in sex ratios. Altogether, these trends are consistent with a demand shock in favor of female labor, which compensated for any potential supply shock.

We discuss alternative explanations for the rise in female participation. In particular, we thoroughly inspect the potential roles of the marriage market and negative income shocks in the determination of the Portuguese FLFP. From the labor supply perspective, as men become relatively scarcer, women are less likely to find a suitable marriage partner and their bargaining power within the household declines. Therefore, the demand for home labor and the shadow price of female labor decline, just like women's non-labor income. Ultimately, the combined effect of these factors leads to an increase in female labor supply (see Becker, 1981; Grossbard-Shechtman, 1984; Chiappori et al., 2002). This mechanism has been shown to dominate in previous studies on the sources of rising female participation, namely those that: concentrated on immigrants groups, which were too small to generate a strong overall demand shock (Angrist, 2002); analyzed the consequences of the military draft during wartime, in which case the demand shock in favor of female labor was partly offset once the war was over (Boehnke and Gay, 2018). Our key insights are based on a comparison of Portugal and Spain. The two countries shared similar social norms and political trends, but while Spain remained a stronghold of the Southern European model of female labor market integration, Portugal diverged. We estimate similar instrumental variable models separately by country and confirm a major impact of sex ratios on female participation and a very small impact on female marriage rates. We then undertake a bounding exercise on the relative importance of supply versus demand forces pulling

women into the labor market in response to changing sex ratios. To this purpose, we combine our estimates with those of Angrist (2002) on the effect of marriage rates on female participation. By 1970, the gap in FLFP between Portugal and Spain had built up to 7 p.p. We find that the gap in sex ratios between the two countries could account for one third to one half of the gap in FLFP. This contribution resulted overwhelmingly from a demand channel, responsible for one fourth to one half of the gap in FLFP; the supply channel provided a dwarfed contribution of, at most, 4%.

We discuss the potential negative income shock that the husband's emigration might have caused on the household, which could have driven women into the labor market. Whereas we cannot dismiss a short-lived negative income shock right after the husband's departure, all reported evidence strongly indicates that three to six months after the start of the emigration spell, remittances would start coming in. From 1969 to early 1980s, they were equivalent to 10% of the country's GDP or over 60% of the country's exports (Baganha, 1994, p. 978). Therefore, in the medium to long run, which is the focus of our analysis, emigration resulted in a clear *positive* income shock to the households, which would be expected to *reduce* female labor supply, as opposed to the increase we witnessed.

Inspection of several labor market outcomes provides strong corroborating evidence in favor of a demand shock driving women into the labor market. First of all, the increase in participation was accompanied by female occupational upgrading between 1960 and 1981. Secondly, we find that lower sex ratios brought about a reduction in gender segregation across occupations and industries, as well as a closing of the gender pay gap. These trends are inconsistent with the predominance of a supply-driven increase in female participation. Indeed, a supply shock would have generated a decline in females' real wages and most likely the perpetuation of traditional occupational patterns.

We assess the similarities and differences of the military draft and emigration flows between Portugal during the 1960s and early 1970s and other countries' experiences that have been documented in the literature, in particular the US. Portugal experienced large variations in population sex ratios across cohorts and regions, as a result of the military draft to fight the war in its African colonies and emigration. The fact that the war took place several thousand kilometers away from the country makes it

comparable to the Vietnam War, while distinguishing our analysis from studies that exploited variation in sex ratios driven by wars fought on the soil of studied countries. Still, the drain of male human resources was of much larger magnitude than in the US. "[A]round one per cent of the country's population was called up to fight. By way of comparison: had the Americans called up the same proportion for the war in Vietnam, they would have had to have recruited and deployed 2.5 million troops instead of the 500,000 that were actually mobilized" (Pinto, 2011, p. 47). The war effort also absorbed a major share of the country's financial resources, as the military expenses reached 63% of the central government budget in 1968 (Pilar and Falcão, 1973, p. 107). Hence, a combination of war and poverty, as well as political persecution, drove the Portuguese to massive emigration. Between 1960 and 1973, over 1.5 million people emigrated (Barreto, 2011, p.200), out of an initial population of 9 million. Initially, that outflow was overwhelmingly male. Crucially, return migration achieved very low values and therefore the shock to the labor market was permanent. This contrasts with the major historical events that have been studied as drivers of an early increase in female participation in the US, France, or Germany: the two World Wars. In those cases, the withdrawal of male labor from the economy was partly reversed once the war was over. On the contrary, the demand shock in favor of female labor in Portugal was sustained.

Other prominent explanations for the rise in female participation in other countries are access to contraception and abortion, as they facilitated career planning. Those were certainly not relevant factors before the mid-1970s in Portugal, as contraception and abortion, just like divorce, were simply outlawed.

Likewise, policies to promote female investment in schooling cannot explain the early rise in female participation in Portugal. In fact, in an unusual deviation from the policies worldwide, the conservative regime that took office in 1926 reduced compulsory education to four years in 1927; it further reduced it to three years in 1930. Symptomatic of the social norms and government policies, by 1956 the country had gender-specific compulsory schooling levels —four years for boys and three years for girls.

Our analysis uncovers that strong demand pressure can overcome the strictest social norms. Once informal barriers or formal regulations are overturned, and employers are

prompted to recruit women, a self-sustained process can be engendered. Preferences start changing, through mechanisms highlighted by different authors. Early entrants may show other families that the workplace can be "respectable" (Goldin, 2006, p. 18). Information transmission among women dissipates uncertainty about the impact of female employment on children (Fogli and Veldkamp, 2011). Husbands realize that the social penalty from their peers for having a working wife is not as high as they had previously perceived (Bursztyn et al., 2018). Employers may adjust their views on gender roles (Goldin, 2006). Transmission of beliefs and preferences across generations will reinforce female participation (Fernández, 2013; Fernández et al., 2004; Gay, 2017; Grosjean and Khattar, 2018). Alesina et al. (2013) innovative study has shown that economic forces can generate long-lasting negative social norms regarding women's participation in the labor market. They can as well change social norms in the opposite direction.

Section 2 describes cross-country trends in FLFP since early 1960s. Section 3 describes the institutional setting in Portugal, focusing in particular on laws on citizenship, voting rights, employment, education, marriage, divorce, contraception and abortion. Section 4 presents the data sets used and the following section details our empirical strategy. Section 6 reports on the results and the following section presents a brief comparison with Spain. Section 8 complements our findings by presenting an archival case that can flesh out how population constraints combined with the economic growth of the decade drove women into the labor force. Our conclusions are presented in Section 9.

2 Trends in female labor force participation

The second half of the twentieth century was marked by a large increase in female labor force participation, widely documented across the globe (Blau et al., 2014; Olivetti and Petrongolo, 2016) and in particular for the United States (Blau and Kahn, 2007; Goldin and Olivetti, 2013). Southern Europe remained for a long time an exception in the developed world, with its persistently low FLFP.

Figure 1 reports cross-country evidence on FLFP growth rates. Between 1960 and 2000, several countries share a similar trend of slowly rising female participation,

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namely Greece, Italy, France, Belgium, as well as Finland, Sweden, and the UK. A striking fact is the parallel trend in Norway and Portugal, as both countries witnessed a very sharp increase in female participation during the 1970s. In Spain, instead, the rise in female participation was slower and more gradual, comparable to Ireland. Another noteworthy trend concerns The Netherlands, which saw its female participation increase sharply over the 1980s and 1990s. Nevertheless, the evolution in this country is hard to compare to other countries, as it has, by far, the highest share of part-time female employment, over 55%, against a 25% average among OECD countries (Jaumotte, 2003; Bosch and van der Klaauw, 2012). Therefore, Portugal diverged from the Southern European model of female labor force integration starting as early as the 1960s, as opposed to Spain, which remained a typical illustration of that model for a long time.

Further insight is provided in Figure 2, which reports the level of female participation across countries over the same period. The lowest activity rates were shared in the early 1960s by Portugal, Spain, The Netherlands, and Norway. Therefore, very low departing levels partly account for the sharp growth rates depicted in the previous figure. In any case, the striking fact is the progress up the distribution of female activity rates for Portugal, Norway, and The Netherlands. Conversely, throughout the period covered, Spain remained at the lower tail of the distribution. Figure 3 provides further details on the evolution of the activity rates in Portugal and Spain, separately by gender and birth cohort. It confirms a much later and slower increase in FLFP in Spain. For males, instead, the trends are similar across the two countries. These diverging trends in female labor supply in Portugal and Spain often puzzle analysts.

3 Institutional setting

Political regime and colonial war

Between 1910 and 1926 the political regime in Portugal (First Republic) was marked by a progressive agenda, regarding in particular gender roles in society and education. However, amidst political and social instability, the winds of modernity came to an abrupt end. The regime was overthrown in 1926, and a dictatorship followed. In 1933, it was relabeled the *New State*, under the leadership of Salazar. It lasted until the

1974 revolution. In sharp contrast to the previous regime, the political agenda turned extremely conservative.

Meanwhile, in the international political arena, the late 1950s and early 1960s were marked by a widespread movement among African colonies for independence from their European colonizers (e.g., from Belgium, France, and the UK).[1] In contrast, Portugal engaged from the early-1960s up until the mid-1970s in a war against pro-independence movements on three fronts: Angola, Mozambique, and Guinea-Bissau. The colonial policy singled out the regime and isolated it internationally.

The war effort absorbed a major share of the country's financial resources, as the military expenses reached 63% of the central government budget in 1968.[2] The words of the minister of finance and the economy at the time confirm the impact of the war effort on the country's development: "[I]t seems that we can say that there was a substantial increase in the share of military expenses [over the 1960s decade] and a significant reduction, thus more worrisome, in the share of development expenses" (Rosas, 1971, pp. 26-27) [our translation]. The war absorbed as well a major share of the country's human resources. The male compulsory military service started the year the individual turned 21 and lasted between two and four years—the deployment in Africa had a fixed length of two years, preceded by a training and a waiting period in mainland Portugal, which combined could last up to two years. Over this period, across the whole country practically every non-disabled man in the eligible age range was drafted into the military, an astounding deployment of human resources.

A combination of war and poverty, as well as political persecution, drove the Portuguese to massive emigration. The share of men who did not show up for military inspection increased steadily between 1961 and 1972, from 12% to 20% (Portugal, Estado Maior do Exército, 1988, p.258). The analysis highlights its correlation over time and across regions with the emigration rate (Portugal, Estado Maior do Exército, 1988,

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[1]For example, the following countries gained their independence over this period: in 1956, Morocco (from France/Spain), Tunisia (from France); 1957, Ghana (from the UK); 1960, Democratic Republic of Congo (from Belgium), Burkina Faso, Cameroon and Côte d'Ivoire and Madagascar (from France); 1961, Nigeria and Tanzania (from the UK); Mali, Senegal, Niger (from France); 1962, Algeria (from France), Rwanda (from Belgium), Uganda (from the UK); 1963, Kenya (from the UK).

[2]The defense expenses increased steadily from 43% of the central government budget in 1960 to 63% in 1968; as a share of the consolidated budget of the central administration, local administration and social security, it increased from 27% to 40% over the same period (Pilar and Falcão, 1973, pp. 67, 107).

p.235). However, the bulk of the emigration flow were not the youngsters avoiding the draft each year, as each full cohort comprised approximately 100 thousand males. In fact, over 1.5 million emigrated between 1960 and 1973 (Barreto, 2011, p.200), out of an initial population of 9 million. Thus the majority of the flow were men emigrating after having served.

In the meantime, during the 1960s, the economy was growing at a fast pace, with the annual growth rate of real GDP ranging from 4.0% to 12.6% (World Bank, 2017). In the early 1960s, Portugal had made modest moves towards international openness, joining EFTA in 1960 and signing GATT in 1962; in 1961, it joined the OECD and the IMF.

The Revolution in 1974 brought to an end the dictatorship and led the way to a modernization process. Approximately a decade afterwards, in January 1986, Portugal joined the European Economic Community.

Gender roles

The Constitution of 1933 was clear on the principle guiding gender roles in Portugal, as it determined that all citizens were equal before the law, with the exception "in the case of the woman, the differences that result from her nature and the good of the family" (art. 5).[3] Laws on education, voting rights, and marriage and divorce, all illustrate a fiercely conservative government and society that aimed at keeping women's participation restricted to the household sphere.

In an unusual deviation from the education policies worldwide, in 1927 the compulsory schooling in Portugal was reduced to four years after the First Republic had set it at five years. It was further reduced to three years in 1930.[4] Crucially, by 1956 the country had gender-specific compulsory schooling levels —four years for boys and three years for girls.[5]

The law that raised compulsory schooling back to four years, but only for boys, also determined an extensive set of enforcement conditions: access to jobs in public

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[3]For a discussion on the social and political context surrounding the evolution of gender-related regulations in Portugal, see Ferreira (2011).

[4]This reform first affected the cohort born in 1920.

[5]This reform first affected the cohort born in 1948 (i.e., school entry took place after completion of age 7, and this law rendered education compulsory for ages 7-12 as of December 31, starting in 1957).

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administration, manufacturing, and the services was forbidden to individuals without a diploma of grade 4, just like the possibility to get a driver's license or participate in official sports competitions. Thus the law confined women with compulsory education to agriculture and household work. Harmonization of compulsory schooling across gender took place in 1960, when it was raised to grade 4 for girls as well.[6] This change potentially widened the labor market opportunities for women.[7] However, Caillods and Rocha (1983, p.16) argue that the gender-specific compulsory schooling law had a long-lasting impact, which could justify a high female drop-out rate upon completion of grade 3 as late as the beginning of the 1970s. Given that these later reforms affected some of the cohorts under our analysis, in the robustness checks section we check whether they could affect our results.

In 1931, both genders were recognized the right to vote, provided they met strict conditions, which were still different across gender and the scope of the election. In national and regional elections, males were required to know how to read and write or, if they were heads of family, pay over a certain amount in property and income tax; females, instead, were required to have a secondary or tertiary education diploma. In local elections, males head of family or living independently could vote; in the case of females, only heads of family were entitled. A significant change took place in 1968, when both genders, if literate, were allowed to vote in national elections. However, in the regional and local elections, the constraints on secondary or tertiary education and head of family status for females still applied, and therefore only a tiny fraction of that gender was entitled to vote.

The 1940 Concordat, a convention with the Holy See, outlawed divorce for those married after that date by the Church, which were the overwhelming majority. Contraception was outlawed in 1942 and abortion remained illegal. The law conferred upon husbands such rights as denouncing an employment contract signed by their wives without their prior consent; also, during most of the period under analysis, women could not apply for a passport without their husband's explicit consent.

This entire institutional setting underwent a significant turn in the mid-1970s, when

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[6]This reform first affected the cohort born in 1950.

[7]For a thoughtful analysis of the newspaper coverage of this legal change, the motivations of the government and its unwillingness to advertise the change, see Adão and Remédios (2009).

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the juridical order started catching up with the forefront of international regulations on women's rights. Most changes took place shortly after the revolution. In particular, all restrictions on voting rights based on gender were abolished and equality of all citizens before the law was recognized without any gender exceptions. Divorce was legalized. The right to family planning was recognized and contraceptives were allowed. Abortion was legalized following a referendum in 2007. Table 1 provides a listing of the major policies with a gender focus during the period under study and changes after the 1974 revolution.

One paradox we aim at understanding is thus the sharp increase in FLFP in a country where the government's policy was strongly geared towards confining women's participation to the household. The rise in FLFP challenged prevailing social norms and government policies, and it diverged widely from the situation in neighboring Spain.

4   Datasets and concepts used

Our main analysis combines the following datasets: individual-level data from the population Censuses for Portugal and France starting in late 1960s; historical records on the number of births by region, cohort and gender, from the National Statistical Office of Portugal; individual-level information on Portuguese fatal war casualties in Africa during the period 1961-1974; administrative linked employer-employee data from the Portuguese Ministry of Labor. We supplement our data with the population Censuses from Spain, Germany, and Switzerland, and historical records on the number of births by region, cohort and gender, from the Spanish National Statistical Office, when comparing trends in the Portuguese and Spanish FLFP.[8]

We obtained the Census micro datasets through IPUMS-International (Minnesota Population Center, 2015). Our analysis sample includes the cohorts born in 1937-1954 observed between ages 26 and 59. Using the Censuses for Portugal and Spain, we compute sex ratios for the prime-age population, participation rates, marriage rates, as well as a set of control variables, by birth cohort and region. Using the Census for France,

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[8]As we will describe in more detail in Section 7, France was by far the most popular destination for Portuguese emigrants, while France, Germany, and Switzerland were the primary destinations for the Spanish emigrants.

Germany, and Switzerland, we compute the stock of immigrants from Portuguese and Spanish origins, by birth cohort and gender. Appendix A provides more details on how we handled the Censuses data.

The historical data on the number of births by cohort, gender and geographic division, are publicly available at the websites of the National Statistical Offices of Spain and Portugal (Spain, INE, 2017; Portugal, INE, 2017b). Part of those data is supplied in electronic format, whereas part is available only in pdf format and we have thus typed them in. For Spain, the original information was reported at the province level, whereas for Portugal it was reported at the district level. To merge these data with the Census region-level codes —the classification NUTS3[9] —, we have aggregated the Spanish provinces into 47 regions and converted the Portuguese districts into 20 regions (see Appendix A for details).

We also collected individual-level information on the Portuguese fatal war casualties that occurred in Africa during the war against pro-independence movements. The official figures for the whole country are 8,290 deceased men and 26,223 injured (Portugal, Estado Maior do Exército, 1988, p.246). The webpage TerraWeb (2016), organized and managed by war veterans, aims at an exhaustive coverage of the fatal casualties. It reports 6,942 records of individual-level information, in particular: detailed place of birth (parish and county), military rank, originmilitary unit in mainland Portugal and destination unit in Africa, year of death, and its cause. For a small share of the dataset, approximately 7%, the exact birth date is reported as well.

For soldiers, corporals, and non-commissioned sergeants[10], the distribution of age at death, though not degenerate into one single value, exhibits an extremely narrow range: for soldiers, over 90% of the fatalities occur at ages 21 to 23; for corporals, over 85% at ages 22 to 24; and for non-commissioned sergeants, over 80% at ages 22 to 25. This fact can be easily understood. The age of exposure to death risk was almost deterministic, given the fixed starting moment for the military service (the year the individual turned 21) and the two-year fixed length of service in Africa. Therefore, we have relied on the knowledge of the military rank and year of death for the population

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[9]Nomenclature of Territorial Units for Statistics.

[10]In the original terminology, *soldado*, *primeiro-cabo*, and *furriel*, the latter meaning a sergeant who is not part of the permanent staff of the Armed Forces.

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of deceased men to infer their year of birth. We did so by replicating, within each region and death year, the overall distribution of age at death by military rank. Thus, the first step in our procedure consisted in imposing a set of constraints on the original dataset, to keep the following: soldiers, corporals, and non-commissioned sergeants (dropping 899 observations), as other ranks have both fewer casualties and a more dispersed distribution of age at death; individuals originating from mainland Portugal (dropping 372 observations from Madeira and Azores), whose death occurred in 1961-1974 (dropping 68 obs.); and cells rank - age at death with at least three elements (dropping 16 obs.).

Finally, we relied on the longitudinal linked employer-employee data for Portugal *Quadros de Pessoal* (QP). This dataset covers the population of firms with wage-earners in the private sector of the economy, as well as all of their workers. It is available for the period from 1985 to 2015, even though no worker information is available for 1990 or 2001.[11] For workers, it reports the gender, birth date, highest education level achieved, occupation, earnings, and hours of work, among other variables. For the firm, it reports the industry, location, size, and sales, among other information. Data from the Census, collected in March 1981, April 1991 and March 2001, were matched to QP data collected in March 1985, March 1991 and October 2000, respectively, at the level of the cell cohort-region.

5 Empirical strategy

5.1 The general setting

The effects of unbalanced sex ratios on female labor market integration have been the object of previous studies. Gay (2017) and Boehnke and Gay (2018) studied the consequences of missing men after WWI for female labor market outcomes in France. In the analysis by Angrist (2002), Lafortune (2013), Raphael (2013), and Conover et al. (2017), migration flows were the driver of imbalanced sex ratios. In turn, Grosjean and Khattar (2018) exploited gender imbalances driven by historical geographic settlement patterns in Australia. The basis of our empirical strategy follows in particular Angrist (2002). Formally, we model the link between the sex ratio and female labor market

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[11]Worker longitudinal data started in 1986.

participation as:

$$fp_{crt} = \alpha + \beta R_{crt} + \delta \ln emp_{crt} + \phi_r + \pi_c + \gamma_t + \rho_{ct} + \zeta_{rt} + \varepsilon_{crt} \tag{1}$$

where fp_{crt} is the female labor market participation rate for birth cohort c observed in region r and year t. We compute the participation rate as the number of active women over the respective population size. We keep for analysis the cohorts born 1937 to 1954, observed in the years 1981, 1991, and 2001, at ages 26 to 59. R_{crt} is the number of men per woman, and $\ln emp_{crt}$ is the log of the total number of individuals employed, meant to capture market-size effects. We control for region, cohort, time, cohort-time, and region-time interaction fixed effects (ϕ_r, π_c, γ_t, ρ_{ct}, and ζ_{rt}, respectively). The variable $\ln emp_{crt}$, meant to capture the overall size of the market, can further account for economic growth and business cycle conditions affecting differently the regions and cohorts over time.

Despite the sets of fixed effects included, there are reasons to believe that the sex ratio and the employment level may be endogenous. Omitted region-cohort specific time-varying socio-economic conditions could influence both the drive to emigrate and the opportunities for women to work. Also, there is a potential issue of reverse causality. As demand for females increases, women could be attracted to specific regions, resulting in a lower sex ratio.

In order to illustrate the potential endogeneity issues when regressing the labor market activity on the sex ratio and the size of the labor market, we present a simple accounting exercise that will also suggest potential instrument-variable candidates to deal with these issues.[12] Let P_{rt}^{gc} be the population of gender $g = m, f$ (male and female, respectively) and cohort c observed in region r in year t (or roughly at age $t - c$). We can decompose this number into:

$$P_{rt}^{gc} = B_r^{gc} + J_{rt}^{gc} - L_{rt}^{gc} \tag{2a}$$

$$= B_r^{gc} + N_{rt}^{gc} \tag{2b}$$

where, for gender g, B_r^{gc} is the number of individuals born in region r and cohort (year) c, J_{rt}^{gc} is the number of individuals from cohort c who have joined region r

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[12]A similar exercise is undertaken in Card (2001), when estimating the impact of immigrants on native workers.

between years c and t and, conversely, L_{rt}^{gc} is the number of individuals who have left the region. The corresponding net flow is expressed as $N_{rt}^{gc} = J_{rt}^{gc} - L_{rt}^{gc}$ (negative, in case of net outflow). These flows include both natural population movements (death of individuals from cohort c) and migratory population movements, whether across regions in the country or international.

Hence, at any point in time, the sex ratio for cohort c is given by

$$R_{rt}^c = \frac{B_r^{mc} + J_{rt}^{mc} - L_{rt}^{mc}}{B_r^{fc} + J_{rt}^{fc} - L_{rt}^{fc}} \tag{3a}$$

$$= \frac{B_r^{mc} + N_{rt}^{mc}}{B_r^{fc} + N_{rt}^{fc}}. \tag{3b}$$

Dividing and multiplying through the numerator and denominator by the number of male and female births, respectively, we get:

$$R_{rt}^c = R_{rc}^c \left[\frac{1 + J_{rt}^{mc}/B_r^{mc} - L_{rt}^{mc}/B_r^{mc}}{1 + J_{rt}^{fc}/B_r^{fc} - L_{rt}^{fc}/B_r^{fc}} \right]$$

$$= R_{rc}^c \left[\frac{1 + j_{rt}^{mc} - l_{rt}^{mc}}{1 + j_{rt}^{fc} - l_{rt}^{fc}} \right] \tag{4a}$$

$$= R_{rc}^c \left[\frac{1 + n_{rt}^{mc}}{1 + n_{rt}^{fc}} \right] \tag{4b}$$

where R_{rc}^c is the sex ratio at birth for cohort c; the terms j_{rt}^{gc} and l_{rt}^{gc} represent, respectively, the inflow and outflow rates between years c and t for cohort c, region r, and gender g, and n_{rt}^{gc} is the corresponding net population flow rate (again, negative in case of net outflow). Taking logs, we can rewrite equations (4a) and (4b) as:

$$\ln R_{rt}^c = \ln R_{rc}^c + \ln \left[1 + j_{rt}^{mc} - l_{rt}^{mc} \right] - \ln \left[1 + j_{rt}^{fc} - l_{rt}^{fc} \right] \tag{5a}$$

$$= \ln R_{rc}^c + \ln \left[1 + n_{rt}^{mc} \right] - \ln \left[1 + n_{rt}^{fc} \right]. \tag{5b}$$

If the flow rates are not too large and the sex ratios not too far from one, we can approximate these relationships using ($\ln X \approx X - 1$):

$$R_{rt}^c \approx R_{rc}^c + \left[j_{rt}^{mc} - l_{rt}^{mc} \right] - \left[j_{rt}^{fc} - l_{rt}^{fc} \right] \tag{6a}$$

$$\approx R_{rc}^c + \left[n_{rt}^{mc} \right] - \left[n_{rt}^{fc} \right]. \tag{6b}$$

It is evident that if the net flow rates were equal across gender, the sex ratio observed at any point in time would be equal to the sex ratio at birth. Likewise, if men were the

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only gender migrating or subject to fatalities at the prime ages under analysis, such that $j_{rt}^{fc} = l_{rt}^{fc} = 0$, the difference between the observed sex ratios at time t and at birth would be given by the difference in male inflow and outflow rates.

More generally, given that the sex ratio at birth is relatively homogeneous,[13] we can infer that heterogeneity in sex ratios at any moment in time results from the gender imbalance in population movements. Clearly, net population movements and their gender composition are endogenous. We thus need to find an instrument for the gender composition of population movements, i.e. the two last terms on the right-hand side of equation (5b) or (6b) (depending on whether we adopt a specification in logs or in levels) or, equivalently, the corresponding terms in equations (5a) or (6a), in case we consider the decomposition of the net flow into its inflow and outflow components. Over the cohorts and period under analysis, out-migration clearly predominated over immigration and natural population movements, as we will show in more detail below. Therefore, the instrument should mostly aim at capturing the change in sex ratio driven by the gender composition of emigration. Instruments should as well tackle the endogeneity of the variable $\ln emp_{crt}$, which captures the overall size of the market.

5.2 Sex ratios

The size of each birth cohort under analysis oscillated around 100 thousand individuals for each gender. At birth, the sex ratio was rather homogeneous across cohorts, ranging from 1.05 to 1.09, with an average of 1.07, in line with the worldwide benchmark (James, 1987; Parazzini et al., 1998) (see Table 2). However, by age 26 to 59, the average sex ratio had dropped to 0.93, and its range across cohorts had widened, from a low 0.86 to a high 1.00. On the one hand, we would expect the sex ratio at birth—above one —to decline subsequently, given that the mortality rate is typically higher for males than females, at any given age into very old age. On the other hand, in the absence of exogenous shocks, we would expect a smaller decline in the average sex ratio than observed. For instance, in the 1990 U.S. Census, the sex ratio was 0.97 for individuals aged 26 to 59 (Minnesota Population Center, 2015).

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[13]We will assume that it is also exogenous (see James (1987) for a review of the literature on the causes of the slight variation in the human sex ratio at birth and Parazzini et al. (1998) for details on its range).

5.3 Instrument based on war casualties

The death rate in the war, by cohort and region, can instrument for the population migratory movements in Portugal. The logic is that, as the threat of losing the life in Africa or returning disabled increased, so did the endeavor to emigrate and escape the draft; after returning from Africa, emigration was part of the strategy to escape poverty, in a country that was channeling a major share of its financial resources to the war effort. The argument is that the incidence of war fatalities in a cohort reflects the intensity of the war and the amount of resources that were allocated to defense, away from development and social infrastructures. It can thus capture two drivers of emigration: the life-threatening conditions faced by men, as a direct impact of the armed conflict, and poverty in general, as a more indirect impact.[14]

The number of war casualties was sizeable: over the entire period 1961-1974 and across all cohorts, it corresponded to roughly 8% of one male birth cohort.[15] Relevantly, the number of casualties peaked in 1969 (see Figure 4) and for cohorts born in 1946 and 1947 (Figure 5, first panel), coinciding with the prime of out-migration flow from Portugal, as will be evident below.

Fatal casualties in the war in Africa likely fulfill also the exogeneity assumption to be used as an instrument. First of all, the war in Africa was partly driven by conditions in the international political arena. As Section 3 described in detail, in the late 1950s and early 1960s most African colonies became independent from their European colonizers. This trend gave ideological and political support to aspirations for independence in Angola, Mozambique, Guinea-Bissau, Cabo Verde, and São Tomé and Príncipe, the Portuguese colonies in Africa at the time. The neighboring newly-independent countries also provided channels for international logistics and financial support to the local movements, together with the geographic basis for their military operation. As a result, 1961 marked the start of guerrilla warfare for independence and

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[14]It could be argued that poverty in the 1960s might be correlated with female labor force participation in 1981 or later. Below, we describe the set of controls we introduce in the regressions for the instrument to meet the exogeneity assumption. In any case, any remaining correlation would be expected to bias our results downwards, i.e., the poverty that induced men to emigrate would presumably be associated with fewer employment opportunities in the region and hence *lower* female labor force participation.

[15]A total of 8,290 deceased men over the 14-year period from 1961 to 1974; the average number of male births per cohort was slightly below 100 thousand.

a massive deployment of Portuguese troops in Africa, initially in Angola, and later in Guinea-Bissau and Mozambique, which lasted until 1974. Secondly, our argument for the exogeneity of the casualties-based instrument rests on the fact that they occurred many years before observing female labor-market participation (between seven and 20 years before our first Census observations on Portugal). Finally, we control for region and cohort fixed effects, as well as their interaction with time fixed effects. Therefore, the variation in sex ratios captured by the instrument should be net of any time-varying social or economic conditions affecting the sex ratio, at the region or cohort levels.

The incidence of war fatalities is expressed as:

$$fatal\_rate_{rt}^c = \frac{D_r^{mc}}{B_r^{mc}}, \tag{7}$$

where D stands for the number of military fatalities that had occurred in 1961-1974 in Africa and B keeps its meaning as births; also, all subscripts and superscripts keep their meaning.[16] This instrument, which aims at capturing both the drive to emigrate and the gender composition of population movements, exploits only the male natural population outflow at very young ages (i.e., deaths of males in their early 20s). The instrument is expected to bear a negative relationship with the endogenous variables, the population sex ratio and the overall size of the market at time t.

Figure 5 (second panel) reports the incidence of fatalities by region and cohort. Its inverted-U shape highlights cross-cohort variation in fatalities, as a result of the intensity of war. It also shows significant cross-regional variation, ranging from no casualty to 1% of a region male birth cohort permanently lost on account of the war. Unlike the temporary withdrawal of men from the civilian labor force to serve in the military, which cut across the whole country, affecting all males in the eligible age range, the rate of war casualties presents heterogeneity across cohorts and regions that we exploit.

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[16]We keep the subscript t just to remind that the population sex ratio varies over Census years t; similarly, its endogenous component, the gender composition of population flows, as well as the size of the market, vary over t. However, this particular instrument does not.

5.4 Instruments based on emigration

We also relied on instruments that directly capture the gender composition of the emigration flow.[17] The flow of emigrants out of Portugal increased from about 20,000 per year in 1950 to more than 150,000 in 1969 (Antunes, 1970, p. 310). The share of illegal emigrants in that flow peaked in 1969, at 61%, having averaged over the 1960s approximately one-third of the overall flow (Antunes, 1970, p. 379, 340, 365). Most of this emigration increase occurred over the second half of the 1960s. Not only did the flow increase significantly, but also its destination changed dramatically. In 1950, close to two-thirds of Portuguese emigrants headed for Brazil and only 1% headed for France. On the contrary, by 1969, 72% of Portuguese emigrants were heading for France, and the proportion heading for Brazil had dropped to less than 2% (see Antunes (1970), Table 6 and Figure 9). The incidence of emigration across regions was very heterogeneous: over the 1960 decade, the legal emigration reached between 10% and 15% of the initial population in the center inland district of Guarda or the northern coastal district of Viana do Castelo (Baganha, 1994; Portugal, INE, 2017c).

Data reported at the destination countries can provide further insight. The French Censuses report information on the stock of Portuguese and Spanish immigrants by birth cohort and gender, for 1968, 1975, 1982, and 1990; the German Censuses report comparable information for 1970, only; the 1970 Swiss Census separately identifies the Spanish nationality, but not the Portuguese, presumably because the stock was not large enough. Given that those three countries absorbed the overwhelming majority of Portuguese and Spanish emigration during the 1960s and early 1970s, we can infer the cohort and gender composition of the migration flow over that period, whether legal or illegal.

Figure 6 shows the stock of male immigrants in those three central destination countries originating from Spain and Portugal, as a share of the respective birth cohort. The contrast is striking. Approximately 8% to 12% of each male cohort born in Portugal in the 1940s is observed living in France or Germany by the early 1970s. It is also clear from the comparison of Figures 5 and 6 that the prime incidence of cohort male out-migration from Portugal coincided with the peak of cohort exposure to death

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[17]A similar strategy is used in Card (2001) (though in a different context), Angrist (2002), and Lafortune (2013).

risk in the war in Africa.

Figure 7 presents a further insight into the timing of the male emigration outflow from Portugal, by comparing information from the French Censuses in 1968 and 1975. The vertical distance between the two lines reveals that the main drain of men born in the 1940s in Portugal, who headed for France, took place between 1968 and 1975.[18] The relevance of such outflow for the labor market was overwhelming. Note that, irrespective of the outflow of females, a major scarcity of manpower was bound to take place in a growing economy where the labor force was in the early 1960s composed almost exclusively of males. Any gender imbalance in emigration rates, in favor of men, could only amplify such an impact. In fact, initially, the outflow of migrants from Portugal was very gender imbalanced, as we observed at the destination countries in the late 1960s, a ratio of 1.5 to 2.5 Portuguese men per woman for our analysis cohorts born up to 1950 (see Figure 8). Later, women made up an increasing proportion of emigrants.

In summary, the information at destination countries reveals a major drain of human resources from the Portuguese economy, from the late-1960s into the mid-1970s, affecting, in particular, the male cohorts born in the 1940s. Given this evidence, the procedure to compute the instrumental variables has a threefold aim. First, the instruments should capture variation in sex ratios driven by the gender composition of the emigration flow. Note that, at the destination country, we have information on gender and cohort, but not on the region of origin. Secondly, they should capture variation across regions in the market size driven by the rate of emigration. Finally, they should avoid a mechanical relationship with the endogenous variables in the analysis years 1981 and later, which would undermine the exogeneity assumption.

We have thus proceeded in three steps to compute these instruments. First, to determine the number of emigrants E of gender g and cohort c, presumed to be absent from region r in Census year t, we relied on the stock of immigrants from that cohort

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[18]From Spain, instead, the period 1968-1975 brought a negligible increase in the stock of Spanish immigrants in France. Antolin (1992, Figure 1') shows that the outflows to France peaked in the mid-1960s and dropped sharply thereafter, to negligible numbers by 1975. Moreover, one should take into account the considerable return migration by Spaniards (which Antolin documents for Germany, though not France).

and gender observed approximately a decade earlier in the destination country:

$$E_{rt}^{gc} = I_{t-a}^{gc} \times \frac{E_{r,50s}}{\sum\limits_{r} E_{r,50s}}, \tag{8}$$

where I_{t-a}^{gc} is the number of immigrants from gender g and cohort c observed at the destination country, France, a years prior to the Census observation moment t in Portugal (t=1981, 1991, 2001, while $t-a$= 1975, 1982, and 1990, respectively). Note that France was the destination of the overwhelming majority of Portuguese emigrants and we have information over time from this country.[19] The final fraction in the equation represents the share of region r in the overall emigration flow from Portugal over the 1950s.[20] Hence we allocate the stock of immigrants observed in the destination country to their regions of origin relying on historical patterns of legal emigration out of Portuguese regions. This reasoning parallels that of Card, when using earlier immigrant settlement patterns to identify the impact of immigration on the US labor market (Card, 2009, p. 7). We here rely on earlier emigration patterns to identify the impact of emigration, building on the tendency of new emigrants to be predominantly drawn from regions where emigration was prevalent earlier on. As such, we avoid the mechanical relationship between the instrument and the endogenous variable that would likely hold if we were to consider the actual movers over the late 1960s or early 1970s decades. The assumption, in any case, is that the 1950s distribution of legal emigrants by region of origin is informative about the origin of the overall emigration flow during the late 1960s and early 1970s.

The second step computes the instruments for the gender composition of population flows, which follow from equation (6a):

$$emig\_gender_{rt}^{c} = e_r^{mc} - e_r^{fc}, \tag{9}$$

where e_r^{gc} represents the rate of emigration for gender g and cohort c over the respective birth cohort in region r. Note that the terms referring to the inflows vanish, as the instrument exploits only the migratory population outflows. Differently from equation (6a), the instrument reports the excess of male emigration over that of females (and

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[19]We would like to thank Steve Bond for suggesting us the use of a time-varying instrument.

[20]We relied on Baganha (1994), who organized the available data on the number of legal emigrants by region of origin in Portugal into decades.

not the other way around). We adopt this convention just for simplicity of interpretation, so that all instruments are expected to bear a negative relationship with the endogenous variables. The instruments based on emigration vary over time t, just like the endogenous variable.

The size of the market, $\ln emp_{crt}$, can be instrumented by the overall emigration rate, in the third step computation:

$$Erate_{rt}^c = \frac{E_r^{mc} + E_r^{fc}}{B_r^{mc} + B_r^{fc}}, \tag{10}$$

with all variables keeping their previous meaning.

Let us clarify how variation in sex ratios at destination country across cohorts translates into large variations in sex ratios for the stayers in Portugal, across cohorts and regions. The instrument naturally varies across cohorts, driven by the differences in the sex ratio at the destination country. Equation (8) then translates that sex ratio for each cohort of immigrants in the destination country into a sex ratio of leavers that is common across regions in Portugal for each Census observation year. Nonetheless, note that the difference of interest $(l^{mc} - l^{fc})$ still varies across regions. The intuition is simple. What matters for our purpose is not the sex ratio of leavers, per se; it is rather its impact on the sex ratio of the stayers —a large imbalance in the sex ratio of leavers will have a large impact in a region where emigration is prevalent, whereas it will have a negligible impact in a region where hardly anyone emigrated. Therefore, the variation in the number of emigrants across regions, combined with variation in the original population sizes, generates variation in our instrument across regions within cohort and observation year.[21]

Again for this type of instruments, we are assuming that immigration observed in France in 1975, 1982, and 1990, and allocated to regions of origin based on historical migration patterns in Portugal, does not have a direct influence on female participation rates in 1981 and in later years, beyond its impact on the sex ratio. The statement is conditional on the inclusion of region fixed-effects, cohort and time fixed effects, together with the interaction of cohort-time and region-time fixed effects.

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[21]A simple example can illustrate that intuition. Suppose the gender composition of emigration at destination is 3m/1f and B=100 for either gender, in two different regions: from region A three males and one female emigrated, whereas from region B 90 males and 30 females emigrated; hence the impact of emigration on sex ratios will be much larger in region B.

5.5 Outcomes under analysis

The primary outcome under investigation is the female participation rate. Our analysis is extended to explore indicators of the gender segregation and the pay gap in the labor market, relying on administrative data and the same empirical strategy (with small adaptations). We also analyze the marriage market. The following is a summary of the computation of all outcome variables.

We compute the following rates over the entire population:

$$y_{rt}^{fc} = \frac{Y_{rt}^{fc}}{P_{rt}^{fc}} \tag{11}$$

where y stands for the activity rate or the marriage rate and Y is the number of individuals in the active population or ever married, respectively; P is the total population in our analysis sample; f stands for females, c for cohort, r for region, and t for the observation year.

Our choice of index to evaluate the degree of gender segregation in the labor market, as well as its presentation below, is based on the thorough discussion of segregation indexes and their properties by Flückiger and Silber (2012). We aim at quantifying the dispersion in the distribution of the gender ratios in employment across sectors in the economy (E_i^f/E_i^m, where E refers to employment and i stands for an occupation or industry). If there were no dispersion, females would be represented equally across sectors, and there would be no "female sectors" or segregation; conversely, a high dispersion indicates that certain segments of the labor market "specialize" in employing females, whereas others "specialize" in employing males. For each cohort c, region r, and time t (all dropped for simplicity), the Gini index of segregation is computed as:

$$Gini = \frac{1}{2} \frac{\sum_i \sum_j \frac{E_i^m}{E^m} \frac{E_j^m}{E^m} \left| \frac{E_i^f}{E_i^m} - \frac{E_j^f}{E_j^m} \right|}{\frac{E^f}{E^m}}. \tag{12}$$

Whereas most measures of relative dispersion consider the distance between each point in the distribution and a reference point (such as the mean), the Gini index considers the distance between each point i and every other point j (see the term in absolute value). The remaining terms in the summation have the role of weights; the denominator in the expression and the term $1/2$ guarantee that the index is bounded between

0 and 1. The computation of the index relied on QP data; the 3-digit occupational classification comprised 109 categories, whereas the industry classification comprised 73 categories.

Relevantly, the fact that the Gini index takes into account the distance between each point in the distribution and every other point makes it sensitive to any transfer of women (men) between sectors. In this respect, it is distinct from the Duncan index, another commonly used segregation index. The latter index evaluates the dispersion relative to a single reference point, the overall mean in the economy. As a result, it is not sensitive to transfers of females (males) across two sectors if they both lie either above or below the mean gender ratio in employment. In such cases, any change in the sex ratio at the origin sector will be compensated by a change at the destination sector, such that the overall distance to the mean will remain unchanged. In the current setting, the Gini index is a more appropriate measure than the Duncan index as we are interested in testing for increased representation of females in predominantly male sectors, and the Duncan index is more likely to capture transfers between sectors whose sex ratios are close to the economy's average.

Finally, we compute the gender gap in real hourly wages as the difference in average log wages:

$$wgap_{rt}^{c} = [log(wh)]_{rt}^{mc} - [log(wh)]_{rt}^{fc}, \tag{13}$$

where wh stands for real hourly wages and all subscripts and superscripts keep their previous meaning. The hourly wage is the ratio between monthly earnings (including the base wage and all regularly paid components, such as food or transportation allowances) and the number of regular hours of work. We convert hourly wages to 2012 prices using the consumer price index.

We use total employment per cell to measure market size in the regressions that consider labor market outcomes, and total population when modeling marriage market outcomes. All regressions are performed at the cohort-region-year cell level, using as analytic weights the number of individuals in the cell. Therefore, when modeling the female participation or female marriage rate we rely on the total number of females in the cell; when modeling segregation in the labor market or the gender pay gap, we rely on total employment in the cell. Standard errors are clustered at the region-year level.

Table 2 provides descriptive statistics on the analysis sample for Portugal, i.e., the cohorts born from 1937 to 1954, aged 26 to 59 in 1981, 1991, or 2001. As previously stated, the sex ratio at prime age is low compared to its value at birth, 0.93 and 1.07, respectively. Female participation rate averaged 0.56, a relatively high value by international standards over the period and cohorts under study. The Gini segregation index across occupations was larger than across industries, at 0.62 versus 0.55. The raw gender gap in real hourly wages was 29 log points. An overwhelming 92% of the females were married, widowed or divorced. However, a lower 82% were married with the spouse present in the household. The average number of own children present in the household was 1.5; given the age of the mothers when we can first observe them, this figure is likely to bias downward the number of children ever born, which, unfortunately, is not reported in the Portuguese Census. Only 13% of women in the analysis sample obtained a High School or University degree. Over the years 1975, 1982, and 1990, we observe living in France 7% of the male cohorts that had been born in Portugal between 1937 and 1954. For females, that share is 6%, as female emigration followed the track of male emigration with a delay. Indeed, relying on earlier data, the 1968 French Census, we find that until then the outflow of males almost doubled that of females (rates of 0.034 and 0.019, respectively, for the cohorts and ages under analysis). Therefore, two different patterns combined to generate a scarcity of manpower in the Portuguese economy. Until 1968, the emigration of the cohorts under analysis took place at a slower rate, though marked by a large gender imbalance. Between 1968 and 1975, instead, the rate of emigration was much larger, even though its gender composition was more balanced. Note that either pattern leads to a scarcity of labor market human resources, in a country whose labor force is almost exclusively composed of males and whose economy is growing very fast.

6 The impact of sex ratios on the labor market

6.1 Female labor force participation and the role of the marriage market

We begin by estimating the effect of the sex ratio on females' labor force participation and compare our findings to the previous literature. Both labor demand and

labor supply channels predict that a decrease in the sex ratio will increase females' participation.

The top panel of Table 3 presents our estimated effect of the sex ratio on female labor force participation. The OLS results, in column (1), point to a partial correlation between sex ratio and labor market participation of -0.09, but as mentioned in Section 5, this finding is likely to be misleading due to the endogeneity of the sex ratio and the market size. Columns (2) to (5) present results where we take into account the endogeneity of these regressors, using our war and emigration instruments. They report specifications considering both the own cohort and cohort windows (from plus or minus one to plus or minus three cohorts), to check whether individuals born in adjacent cohorts could influence each other and the robustness of the results.[22] The IV evidence points to more substantial impacts than the OLS counterpart.[23] The estimated coefficient of the sex ratio in the female participation regression is now -0.3. Hence, if the sex ratio were to decrease from 1 to 0.9, female participation would increase by 3 p.p. Concerning employment, the results show that a 1% increase in employment raises female participation by 0.15 p.p. Our results are robust across windows of cohorts. The first stage results point to relevant instruments (see the Angrist-Pischke F-statistics). Also, the tests on overidentifying restrictions do not reject the null hypothesis of exogeneity of the instruments. Overall, our results are in line with the previous literature, suggesting that relative scarcity of men leads women to enter the labor market.

We now investigate whether the marriage market channel can explain our findings, as suggested by the majority of papers investigating the impact of the sex ratio on FLFP. Panel B in Table 3 suggests a very weak or no significant impact of the sex ratio on the marriage market in Portugal. Although the estimate found under column (2) is statistically significant at 10%, its magnitude is small: if the sex ratio were to decrease from 1 to 0.9, female marriage rate would increase by 0.6 p.p. All other estimates remain small and are statistically insignificant at conventional significance levels. Interestingly, the marriage rate with husband present in the household reacts

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[22]For example, they could compete for the same husband, job, and so on.

[23]A potential explanation as to why the IV estimates are more negative than the OLS' is that males could react more easily to 'booming' regions leading to a positive correlation between the sex ratio and overall labour force/employment rate (of females and males). Such a correlation would lead the OLS estimator to be upward biased.

slightly more to the sex ratio instrumented with emigration and war fatalities indicators (see panel C). In any case, the results either remain insignificant or are hardly significant. These results on the muted marriage market can be easily rationalized.

The overwhelming majority of men emigrating were either already married or later got married in Portugal. As a result, on the one hand, female marriage rates did not reflect the relative local shortage of men; naturally, marriage with spouse present reflects it slightly more, even though still to a small extent. On the other hand, remittances by the husband to support the family could reduce a potential negative income shock to the household. We elaborate on these points below.

The analysis by Wall (1985) is enlightening to understand the impact of emigration on the women who stayed back home. She first documents the large scale of the emigration flow that resulted in over two million Portuguese living abroad by the end of 1974 (when the country's population was below 9 million) and the absence of significant return migration. Her compilation of data suggests that back then approximately half the married immigrants in Europe, from all origins, were living without their families. We collected this specific information from the French Census, for the Portuguese in France. In 1968, 48% of the married Portuguese males living in France did not have their spouse in the household. By 1975, as a result of the female migration flows previously described, a lower 16% of them did not have their spouses living with them.[24] Either figure contributes to explain why the female marriage rates in Portugal were not responsive to the local relative scarcity of men.

Based on a series of case studies, Wall (1985) provides a vivid analysis of the motivations and consequences of husbands' emigration for the women back in Portugal. The motivations of the man to emigrate on his own and, possibly, remain without his family at destination, were diverse: the risky nature of the clandestine emigration route common at the time; the geographic proximity of the destination country, which enabled one, or even two, visits a year to the family; lack of financial conditions to support the family at destination; regulations at the host country imposing a minimum stay, or formal proof of stable employment or proper housing to accommodate the family; need for physical presence of the woman back home to take care of elderly

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[24]In contrast, only 8 and 6 percent of married Spaniards living in France did not have their spouse in the household in 1968 and 1975, respectively.

relatives or of the small agricultural plot; the legal requirement to wait for the husband's official "call" document in order to emigrate, given that under the law a woman could not cross the national border without the explicit consent of her husband; reluctance of some women themselves, especially if illiterate, to face unfamiliar surroundings. The progressive integration of women in the labor market that followed is also spelled out. It all started in the agricultural sector, where women increasingly took the responsibility of the activity, together with the burden of physically heavy, traditionally male, tasks. Also, they were impelled to work in the fields as wage-earners, to sell home production, or find small side jobs in the forest or the sea to satisfy the material needs and financial commitments shortly after the husband left. The ambition to work in a factory, where working conditions and pay were better, eventually materialized for some of them. The increased responsibilities as heads of the household also led women to start dealing with the public administration and banks, activities that had before been reserved for the husband.[25]

Nevertheless, gender attitudes took long to change. The majority of emigration originated in rural and the most deprived areas of the country. The analysis by Wall (1985) highlights that, despite increased responsibilities, there were no gains regarding social participation, recognition of authority, or personal freedom for women. On the contrary, stricter social control and a more confined social life were imposed on the woman whose husband was working abroad.

The remittances from the emigrant would usually start three to six months after departure (Wall, 1985). They were sent at irregular time intervals and amounts, but were identified as crucial for the household maintenance and to repay the debts contracted to fund the emigration journey. In fact, the available figures indicate that between 1969 and 1982, the yearly emigrants' remittances were equivalent to 10% of Portugal's GDP (Baganha, 1994, p. 978). Both pieces of evidence let us infer that the physical absence of the male emigrant was not likely to be associated with a negative income

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[25]Married women with children whose husbands left relied on the extended family or even neighborhood support, namely to take care of the children, under a social model that prevails to our days, in particular in rural areas. It would also be of interest to identify whether married or single women first joined the labor market. However, we are constrained by our data. We observe female participation several years after the decision to enter the labor market and meantime the marital status may have changed. We do observe whether the woman was ever married and her labor force status at Census observation moment.

shock for the household at origin, at least shortly after the start of the emigration spell.

We also attempted to analyze fertility, to further document the response of the labor supply channel to sex ratios. Unfortunately, the Census on Portugal does not report the number of children ever born, but only the number of own children living in the household. The latter is likely to misreport the fertility of some cohorts of women under study, observed in 1981 or in later years, given the early age at first child birth and at marriage, both for the cohorts under analysis and their children. More worrisome is the fact that the downward bias could be particularly severe for the cohorts of women with higher rates of husbands' emigration, if their children were more likely to have followed the fathers' emigration path. Indeed, we can infer the relationship between the number of children ever born to a woman and the number of those living in the household relying on the Spanish Census, which reports both variables in 1991; for our analysis sample, their average values that year were 2.3 and 2.0, respectively, with a correlation of 0.57. In any case, estimation for Portugal of the OLS model using the available outcome variable (average number of own children present in the household per woman) points to no impact of sex ratios on fertility; in the IV model, the hypothesis of exogenous instruments is rejected, as we would expect if the children of men living abroad were more likely to leave the household in Portugal to emigrate.[26] Therefore, given data limitations, we have not pursued further this line of analysis.

The very limited impact of sex ratios on the marriage market is preliminary evidence pointing to little scope for labor supply mechanisms. These results differ from those in the previous literature. Indeed, Angrist (2002) interprets the diminished impact of sex ratios on female participation, when compared to their impact on female marriage, as evidence of the role of the supply channel. Boehnke and Gay (2018) analyze wages and find that their patterns are not compatible with a strong demand push that could have outweighed the rise in supply. Gay (2017) and Grosjean and Khattar (2018) conclude that changes in attitudes have a long-lasting impact on female participation and their reasoning emphasizes labor supply mechanisms. One could reasonably expect this difference in results. The previous studies concentrated on specific sets of immigrants, temporary withdrawal of men from the civilian labor force during a war,

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[26]Results are available from the authors upon request.

or war casualties reflected in the behavior of later generations. Therefore, the shocks under analysis were most likely too small, temporary, or remote in time, to place relevant constraints on employers in the overall economy. Instead, in Portugal the war and emigration shocks combined were so large and persistent that they were bound to place economy-wide constraints on labor demand.[27]

However, a relative shortage of men has also potential effects on the demand for female labor. US studies of the impact of WWII refer to this channel, but they underline the transitory nature of the shock (Goldin, 1991; Acemoglu et al., 2004; Goldin and Olivetti, 2013). Demand forces may have shaped the rise in female participation in Portugal for the cohorts under analysis. Employers may have turned to women to occupy some of the jobs men had left, substituting for the missing males, at a time when the economy was growing fast. In the sections below we further investigate this possibility, by inspecting a broader set of outcomes on female labor force integration.

6.2 Gender segregation in the labor market and pay gap

Occupational upgrading and higher wages for females would provide corroborating evidence in favor of the relevance of demand as the primary force driving women into the labor market. Conversely, an increase in female labor supply as documented in the previous literature for other countries is expected to lead to lower females' wages and, most likely, the maintenance of the existing gender occupational patterns. This section is dedicated to the analysis of the impact of sex ratios on gender segregation in the labor market, among occupations and industries, and the gender pay gap. We adopt in sequence three complementary perspectives: a reference to the early literature on the issue; descriptive evidence comparing the occupational distribution of males and females in the 1960 Census and the following years; regression analysis relying on the IV identification strategy previously used and on linked employer-employee data covering the population of firms and workers in the private sector of the economy.

The fact that Portugal once had low gender occupational segregation has generally

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[27]As early as the 1920s (Groves and Ogburn, 1928; Cox, 1940; Guttentag and Secord, 1983) there was evidence that the ratio of males to females in society influences both the marriage market and the labor market, for women in particular. An increasingly rich line of work focuses on the impact of sex ratios on the marriage market and fertility, though not on labor market outcomes (Abramitzky et al., 2011; Bethmann and Kvasnicka, 2013; Brainerd, 2017).

been overlooked in the study of its labor market. Interestingly, however, it did not escape the keen analysis by Ferreira: "Portugal used to be an exception to the rule that levels of sexual segregation tend to be higher in countries with higher rates of female employment" (Ferreira, 2011, p. 160). The author documents the statement with cross-country data referring to 1990 and shows that gender segregation has increased since then, as a result of the expansion of the services sector and female-dominated occupations, a worldwide trend that has received much attention. The entry of females into traditionally male sectors or occupations had sporadically been acknowledged in the earlier national literature (see Caillods and Rocha (1983)).

Next, we retrieve the occupational distribution of the male and female active population from the scanned version of the 1960 Portuguese Census, available at Portugal, INE (2017b). We define whether an occupation was male- or female-dominated using these historical data, before our analysis period (Appendix A provides details on how we handled the conversion of the occupational classification in the original 1960 Census in Portugal into the IPUMS classification). Note that the relative number of males over females in an occupation is bound not to be informative, as every occupation employed overwhelmingly males in 1960, when the female participation rate was so low. Instead, the measure to be used should reflect the relative concentration of males or females in an occupation. We thus computed the share of the active population A of gender g engaged in occupation i as $sh_{1960}^g = A_{i,1960}^g / A_{1960}^g$. An occupation is classified as male-dominated if its relative incidence on males over females, $I_{1960} = sh_{1960}^m / sh_{1960}^f$ is larger than two; conversely, it is classified as female-dominated if the ratio is smaller than 0.5; for any value in-between, it is classified as mixed gender. Table 4 reports the classification.[28] The "blue" or male-dominated occupations as of 1960, are: legislators, senior officials and managers; skilled agriculture and fishery workers; plant and machinery occupations; elementary occupations; Armed Forces. The "pink" occupations are: professionals; service workers and shop and market sales. Mixed occupations are: clerks; craft and related trades workers.

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[28]The data available for 1960 by gender and occupation refer to the active population. For comparability with 1960, we have considered for later years the active population and imposed no constraints on cohort or age. The category "technicians and associated professional" was first introduced in the occupational classification ISCO-88, including a wide spectrum of occupations in science, health, business; legal, social, and cultural activities; as well as information and communications activities.

Columns (2) to (6) in Table 4 report the trend from 1960 to 2011 in the distribution of each gender across occupations. The evidence by 1981 is striking. All occupations that were predominantly male in 1960 —with the notable exception of elementary occupations —saw the representation of women increase remarkably between that year and 1981. Consider legislators, senior officials, and managers. Whereas in 1960 it occupied a negligible 0.4% of the active women, by 1981 it engaged 4.3%, an eleven-fold increase; for men, instead, the increase was less than three-fold, such that by 1981 the incidence of this occupation among females and males was approximately the same. Plant and machine operators witnessed the same trend. The share of women in this group went from a negligible 0.2% in 1960 to 1% in 1981, a five-fold increase, whereas for males it only doubled, from 3.1% to 6.3%. The relative presence of women in skilled agricultural and fishery occupations also increased, but in this case, the share of men holding this type of jobs declined sharply, while the share of women underwent little change. By 1991, some of these trends were partly reversed, but in plant and machine operators the relative presence of women kept increasing at a fast pace. Overall, the Census information reports an impressive occupational upgrading for females in Portugal between 1960 and 1981, as women were embarking on occupations that were until 1960 almost exclusively male.[29]

The core of the analysis in this section relies on a detailed classification of occupations for the population of workers employed in the private sector. Table 5 reports results on the impact of sex ratios on the gender segregation across occupations, across industries, and on the wage gap, using the QP data and the IV strategy used in the previous section. The top panel suggests that a decline in the sex ratio from 1 to 0.9, reduces gender segregation across occupations by approximately 0.020 (the average over the period was 0.62 and its standard deviation, 0.09). The impact is slightly more substantial on industry segregation (panel B). The same change in the sex ratio would lead to a reduction of gender segregation across industries by approximately 0.03 (the average over the period is 0.55, and the standard deviation is 0.09). In both cases, we can see that the effect is sizable, once compared to outcome standard deviation. Also

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[29]It would be interesting to check if women entered less segregated occupations to begin with. Unfortunately, we cannot make statements on that timing, as we observe female participation and its pattern at decennial Census years, but that analysis would require more frequent data.

in these cases, the instruments perform very well.

General trends in female labor supply, for example those that are due to changes in social norms (Fernández, 2013) and technological progress (Bailey, 2006; Goldin and Katz, 2002), if present over the covered period, are not expected to bias our results, given that we control for cohort and year fixed effects, together with their interaction. Our use of instruments (that are unlikely to be correlated with these trends) reinforces the idea that the observed correlation between the sex ratio and occupation and industry segregation is causal, and supports our labor-demand explanation for the increase in FLFP. The intuition is that the relative scarcity of males led women to join the labor market in industries and occupations that were previously predominantly male.

The bottom panel of Table 5 reports the results on the gender pay gap. A decline in the sex ratio from 1 to 0.9 reduces the gender pay gap by 5-8 p.p. This finding further supports the labor demand channel as a driving force behind the increase in female employment in Portugal. If the main explanation for the increase in female employment were an increase in supply, we would have expected an increase in the gender wage gap (Acemoglu et al., 2004; Boehnke and Gay, 2018).

Overall, the compelling evidence that women moved up the occupation ladder, that gender segregation in the labor market declined, and that the gender pay gap closed, together with the almost irrelevant changes in the marriage market, underline a demand shock as the main driving force for the early female labor market integration in Portugal.

6.3 Robustness checks

We conducted several robustness checks. In our main specifications, we do not control for education as it could have been affected by the sex ratio (e.g., if women were drawn into the labor force at earlier ages). We find some mixed evidence that education is affected by the sex ratio.[30] However, Portugal implemented two gender-specific schooling reforms, in 1956 and 1960 (see Section 3), which could have impacted the outcomes of interest, since the cohorts affected by the reforms were born in 1948 and 1950, respectively. If the implementation of these reforms varied across regions and, for whatever reason that we cannot foresee, was correlated with our instruments, we could

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[30]Results are available from the authors upon request.

falsely interpret the effect of these reforms as the effect of the sex ratio. Therefore, Tables 6 and 7 present results including a control for female average years of education. We find reassuring that the results hardly change. If anything, the impact of the sex ratio on FLFP becomes slightly more negative when controlling for education, with the IV point estimates fluctuating between -.4 and -.5. The estimates for all other outcomes of interest remain unchanged (and so does their statistical significance).

Next, we investigate whether the data source and the number of industry and occupation categories affect our segregation findings. The Portuguese Census does not contain information on wages but does contain some harmonized information on occupation and industry, which we used in section 6.2. The number of categories is significantly smaller (10 for occupations and 16 for industries). The top two panels of Table 8 present the results for occupation and industry segregation, based on this smaller number of categories. The sex-ratio parameter estimates for the occupation segregation regressions are similar to the ones based on the QP data. Although the estimates are similar, the standard errors are significantly larger when using the Census data. Despite the resulting lack of statistical significance at conventional levels, their p-values are .17, .11, .12, and .09. The sex-ratio coefficient estimates for industry segregation are all larger than the ones from QP data and all statistically highly significant. Given that we observe a different number of categories in the Census, it is difficult to interpret the difference in magnitude between the two sets of industry-segregation results, but overall, they point in the same direction.

Finally, in the bottom panel of Table 8, we consider a different definition of wages, to include overtime instead of using only normal hours and associated pay for the computation of hourly wages. The results remain virtually unchanged.

7 Portugal-Spain comparison

By way of illustration, we show how far sex ratios can go explaining the early contrast in female participation rates in Portugal and neighboring Spain, and how much of it operated through a demand versus a supply channel. The contrast in FLFP in Spain and Portugal after 1960 is puzzling, as the political and ideological trends in both countries were similar. Spain had also experienced a period of a progressive

government (the Second Republic, from 1931 to 1936), followed by a period marked by a conservative and pro-Church government (the Franco regime from 1936 to 1975). Attitudes and policies on gender roles were similarly conservative (see Appendix B for more details on the institutional setting in both countries over our analysis period).

The critical difference concerns the colonial policy and emigration flows. During the first half of the century, Spanish emigrants headed primarily for South America (e.g., Argentina, Brazil, Cuba, and Uruguay). After a slowdown during the Spanish Civil War, emigration increased significantly between 1960 and 1973. The shift from transatlantic emigration to European destinations was common for Spain and Portugal. Over that period, more than 100,000 people per year emigrated to France, Germany, and Switzerland. Between 1962 and 1970, about 42 percent of the Spanish migrants heading for other European countries went to Germany, 28 percent to Switzerland, and 23 percent to France (Bover and Velilla, 2005). Overall, an estimated 1.5 million people emigrated (Bover and Velilla, 2005, Figure 1) from Spain during the 1960s and early 1970s. However, a comparable absolute number of emigrants in the two countries has, naturally, very different meanings in a country of 9 million (Portugal) or one of over 30 million (Spain) inhabitants. Comparison of Tables 9 and 2 further documents that contrast: whereas the male emigration rate (over birth cohort) tracked in 1975 in France and in 1970 in Germany and Switzerland was 3% for Spain, it was 8% for Portugal (in this case, not counting the Swiss destination, as the Census does not separately identify Portuguese nationality). The Spanish emigration rate was not only remarkably lower than the Portuguese, it was also much more gender balanced (Figure 8). For both reasons, the scarcity of male human resources in the Spanish economy is not expected to have achieved proportions and implications anywhere comparable to Portugal.

The Spanish Census data used in our analysis, as well as the historical birth records, refer to the same years as Portugal and the same age-cohort conditions. For the IV regression analysis, we use the largest set of emigration destination countries feasible, at observation moments as similar as possible. We are constrained by the fact that in the two major destinations of Spaniards (Germany and Switzerland) we can only separately identify their nationality in 1970. Therefore, we have relied on data from the German and Swiss Censuses in 1970, and from the French one in 1975. An essential

difference between the analysis undertaken in this section and the previous ones thus concerns the source of variation in the instruments: they will vary solely by cohort and region, but not over time.[31] We construct our instruments adapting equation (8), with the final fraction of the equation for Spain representing the share of region r in the overall emigration flow over 1961-1965, as information for the 1950s is not available. Given that no instrument based on war is available for Spain, the instrumental variable analysis relies, in this case, only on the two emigration instruments.

Table 10 reports the results on female participation. The OLS estimates in column (1) are of comparable magnitude in the two countries: -.09 for Portugal and -.07 for Spain. The results on Portugal in this Table and those on Table 3 are very similar. The cross-country comparison is undermined by the fact that the instruments tend to perform poorly for the Spanish case. Indeed, the more prevalent family emigration from Spain and its lower overall rate lead to a reduced variation in the emigration instrument across cohorts and regions, which is expected to weaken our first-stage estimation. Nevertheless, the magnitude of the impacts is similar for the two countries in specifications where the Spanish instruments are significantly correlated with the endogenous variables (F-statistics greater than 10, in columns using +-2 or +-3 cohorts windows), even though the coefficients are estimated with much less precision. Overall, the results suggest that the way the FLFP reacts to an increase in the sex ratio is not essentially different across the two countries. The results reported in Table 11 point to no impact of sex ratios on the marriage market in either country.

We now discuss the relevance that differences in sex ratios may have had in shaping the divergence in female labor force participation in Portugal and Spain and decompose it into a demand versus a supply channel. Consider the benchmark impact of sex ratios on female participation, between -.3 and -.5, that was derived exploiting variation in sex ratios across cohorts and regions, under our instrumental variable procedure. Recall that in 1960 the two countries shared one of the lowest female participation rates in the OECD, around 17% for the population aged 15 and older (World Bank, 2018). By 1970, the female activity rate in the two countries had started spreading

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[31]The Swiss Census does not identify Portuguese immigrants, and therefore the emigration instrument will be based on France and Germany for Portugal; on France, Germany, and Switzerland for Spain. This difference should not have severe consequences for our analysis since the vast majority of Portuguese emigrants went to France.

apart, reaching 25% in Portugal and a lower 18% in Spain. The gap in FLFP was thus close to 7 p.p. Meanwhile, the sex ratios for that same age group had diverged considerably across the two countries, reaching 0.858 in Portugal and 0.923 in Spain, which imply a relative deficit of 6.5 men per 100 women in Portugal compared to Spain, in the working-age bracket (Spain, INE 2017; Portugal, INE, 2017b). Given the reaction of female participation rates to the sex ratio, we can account for 2 to 3.3 p.p. difference in participation rates. It thus follows that roughly one third to one half of the actual difference in female participation rates between Portugal and Spain in 1970 can be explained by the relative scarcity of males in the Portuguese economy. This is a noteworthy contribution to the explanation of the diverging trends in FLFP across the two countries.

How much of this impact of sex ratios was brought about by supply versus demand forces? We estimated a rather small effect of sex ratios on marriage rates, ranging between zero and 0.059. Hence the gap in sex ratios between Portugal and Spain in 1970 would predict a difference in marriage rates, of up to 0.4 p.p., and therefore an effect on labor supply cannot be ruled out. To investigate this hypothesis, we rely on the insight from previous studies, in settings where supply forces have dominated. In particular, Angrist (2002) concentrated on second-generation immigrants in the US, showing that sex ratios had a relevant impact on the marriage market and labor supply as determinants of female participation. This is expected if the group under study is not large enough to generate a demand shock in the economy. He specifies that "each percentage point increase in marriage induced by increased sex ratios is associated with two-thirds of a percentage point reduction in labor force participation" (Angrist, 2002, p. 1022). Hence, in our case the detected overall impact of sex ratios on female participation (from 2 to 3.3 p.p.) can be decomposed into a supply and a demand mechanism of the following magnitudes: the supply channel accounts for up to 0.3 p.p., given the predicted gap in marriage rates and its impact of female participation (i.e., -0.04 x 0.66); the demand channel accounts for the remaining 1.7 to 3.3 p.p. impact of the sex ratio on FLFP. Thus the impact of sex ratios through the marriage market can account for up to 4% of the actual difference in female participation rates between Portugal and Spain in 1970; the remaining impact of sex ratios operated through a demand channel, driving one fourth to one half of the gap in female participation rates

between the two countries in 1970. In any case, we do not dismiss the possibility that the contribution of the supply channel may have been slightly larger if emigration generated a short-lived negative income shock on married women. The case studies by Wall (1985) point out that women were left with the responsibility to pay back the debt contracted for the husband's emigration journey, as well as the responsibility for raising the children, all of which amounted to a heavy financial burden until remittances would start arriving, three to six months after the husband had left.

Crucially, we found extensive corroborating evidence in favor of the hypothesis that demand pressure by employers was a major force initially attracting women into the labor market in Portugal: occupational upgrading, the reduction in the gender pay gap, as well as declining gender segregation across industries, can only be accommodated under overwhelming demand pressure. If the increase in women's desired labor supply had been the dominant force, we would have witnessed a decline in their relative wages and, presumably, the reinforcement of labor market segregation, within occupations or industries.

Over the 1970s, the sex ratio in Portugal became more balanced, as women followed the path of male emigration. Nevertheless, by then several propagation mechanisms may have been underway to increase female participation. Labor market entrants during the 1960s and early 1970s may have shown other women and families that "the workplace could be respectable" (Goldin, 2006, p. 18). Women's fears over the impact of maternal employment on their children may have been reduced by observing other women (Fogli and Veldkamp, 2011). Husbands themselves may have realized that the social penalty from other men for having a working wife was not as high as they had previously perceived (Bursztyn et al., 2018). An initial increase in female participation may have accelerated a process of changing views on gender roles by employers themselves (Goldin, 2006). The transmission of beliefs and preferences on gender roles across generations has been documented by Fernández (2013), Fernández et al. (2004), Gay (2017), and Grosjean and Khattar (2018), and its effects may have been felt already in the early 1980s for the older cohorts of women who worked during the 1960s. The consequences of an early gender imbalance that attracted women into the labor market are likely to have combined from the mid-1970s onward with the modernization process that the country experienced. Such a trend may also have been

reinforced by the low wage levels in the country and the associated need to rely on more than one wage-earner in the family.

8   Archival case: the salt production in Alcochete

Having shown that gender imbalances in the composition of the population can account for up to half of the early trends in female participation in Portugal, we now turn to an archival case that can flesh out how the economic growth of the decade combined with population constraints drove women into the labor force. Alcochete, a small county of approximately 9 thousand inhabitants back in 1960, is located on the South bank of the estuary of the river Tagus, opposite Lisbon. It was a rural area marked by the proximity to the river, with economic activities comprising handcrafted boat building and repair, agriculture, fishing, and salt extraction. It was the largest salt producing center in Portugal during part of the 20th century. Its salinas can help document the early female entry into the labor market in the country.

The archival material we use includes the following: the national Census of the salinas undertaken in 1954-1960 by the Authority for the Regulation of Pharmaceutical and Chemical Products; the archives of two major employers in the salt extraction sector; information from other independent sources collected through interviews, namely the personnel at the Municipal Museum, as well as current senior personnel of the two employers whose archives we accessed.

The 1970 Census reports a comparison of the population present in 1960 and 1970 at the county level (Portugal, INE, 2018). While declines by as much as 20% to 35% were common in several counties, Alcochete belongs to the geographic unit that attracted most population over that period. Nevertheless, its population increase, by 0.9%, did not prevent the decline in the sex ratio, from 0.99 to 0.97.

The centuries-long economic dynamism of the Alcochete salinas declined over the 20th century and the closure of operations took place gradually: the largest employer, Santa Casa da Misericórdia de Alcochete (SCMA), stopped production in mid-1980s[32]; the latest employer to do so, in 2012, was Fundação João Gonçalves Júnior (FJGJ),

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[32]Maria de Lourdes Barroco (staff at Santa Casa da Misericórdia de Alcochete), conversation with the first author, August 2, 2018.

once another major salinas owner[33]. The outdated technology, the decline in the tradition to use salt to preserve food in favor of the cold technology, together with international competition, were some of the reasons for the decline of the industry throughout the country.

The need for strategies that would reverse the crisis and the relevance of the sector for the national economy led to the administration of an official census of the salt production sector between 1954 and 1960. It collected thorough information on each salina: its ownership and exploitation structure (whether by the owner or renter); detailed physical description of the salina and its technology; labor force; quantity and quality produced; commercialization; financing of activities; as well as a discussion of optimal firm size and ownership structure, organizational and technological change.

The concentration of property distinguished this region from another major production salt region, Aveiro (Lopes, 1954; Lepierre, 1936; Neves, 2005), with clear implications on the characteristics of its workforce. Whereas in Aveiro it was composed mainly of the owner or renter with the help of a young man, often the only employee, in Alcochete the work was performed by a wage-earner proletariat (Amorim, 2005; Neves, 2005). Seasonality marked the work in the salinas. In spring, the ponds were repaired and cleaned, in early summer they were filled with sea water, and its flow across the different types of ponds (supply, evaporation, and crystallization) was monitored and regulated. Salt harvesting took place during peak summertime into September. The salt was first carried from the side of the pond to the salt mountain and later loaded onto boats or trucks. In autumn, the salt bed was flooded, awaiting the following season. A few jobs were performed by regular employees of the firm, but most labor was hired on a daily or task basis during the high season (Lopes, 1954, p.52-55). The task of salt transportation was particularly hard, as it involved carrying a basket that weighted approximately 50 kg on top of one's head.

At the time, the labor force in the Alcochete salinas was composed exclusively of males (see the analysis in Lopes (1954), Marques (2009), and conversations with senior personnel at the Municipal Museum, FJGJ, and SCMA[34]). The 1954 Census reports

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[33]Álvaro Costa (Secretary-General of Fundação João Gonçalves Júnior), conversation with the first author, August 3, 2018.

[34]Marto Alves (staff at the Alcochete Municipal Museum), conversation with the first author, July 31, 2018; Costa, conversation; Barroco, conversation. The summary by Magalhães et al. (1998) also

a rigid wage distribution: the head of the salina earned a base daily wage of 27 PTE, raised to 31 PTE in peak summer[35], when he was also entitled to a food allowance of 85 PTE a month; at the end of the season, he received a premium of 250 PTE. The other two jobs involving more responsibility paid the same base wage, but a slightly lower food allowance and end-of-season premium. The seasonal workers earned 26 PTE a day, raised to 30 PTE at the end of August; salt carriers from the pond to the pile, paid on a piece rate, made approximately 50 PTE a day; loading of salt onto the boats or trucks was paid at 4 to 5 PTE per 15 baskets and the daily wages fluctuated more. At the time, there were no contributions deducted.

Interestingly, when arguing for the mechanization of tasks in the salt production in Alcochete, the regulatory entity who undertook the census, highlighted negative social implications it could have, as the workers replaced by machinery could have trouble finding a job elsewhere. Yet, the 1960s witnessed the change in circumstances we have been analyzing. Firestone tire factory was inaugurated in April 1960 (Firestone, 1966); units for the processing of aluminum and cork followed. Manufacturing brought better wages and working conditions than the traditional alternatives of the salinas combined during wintertime with agriculture or coal unloading from boats docked in the Lisbon harbor. The shortage of male human resources in the salinas was felt more acutely by the largest employer in the region, SCMA.

By 1971, the labor force of the largest salinas employer had shifted into one fourth to one third female during peak season; another major employer, FJGJ, never felt the need to employ women (see Figure 9). These data were collected from the archives of the employers, inspecting their first year of monthly exhaustive personnel records sent to the Social Security. The following information was systematically reported: name, identification code, and location of the employer; for each worker, the full name, identification code, occupation, daily wage, number of days worked in the month, total monthly earnings, as well as details on any impairing work injury. The employer had to send each month a contribution equivalent to 23.5% of the gross wage bill to the Social Security. The obligation to send the monthly personnel records and their contents were

mentions the need to start recruiting women in the Alcochete salinas, even though it does not precise the exact moment of the change. This contrasts with Aveiro, where it was not uncommon to see women carrying salt (Amorim, 2005; Neves, 2005).

[35]The exchange rate in the 1960s was 29 PTE to 1 USD (Banco de Portugal, 2018).

strictly monitored, with fines enforced for the non-compliers.

The seasonality of the salt production is clear in Figure 9. The peak workload occurred from July to September, followed by June and October. From January to March and in December, there was hardly any work. Accordingly, female employment was concentrated from July to September and no hiring of females took place from January to May or in December. The first women to work in the Alcochete salinas immigrated from Murtosa, close to Aveiro, and they would combine work in the cod salting industry with work in the salinas and agriculture.[36]. Later, women from the outskirts of the Alcochete village, previously engaged in agriculture, joined the salt production workforce. This hint at the potential existence of endogenous changes in sex ratios reinforces the appropriateness of our econometric approach based on instruments for the sex ratio.

The daily wage rate presented a very narrow distribution, concentrated at 60 PTE for women and 70 PTE for men, with few exceptions for the male jobs involving more responsibility and a few cases of lower daily wage. The gender gap was thus 0.25, very stable throughout the months women were hired. The average number of days worked per month per woman relative to that per man showed no particular pattern, ranging from 70% (women working on average fewer days a month than men) to 110% (vice-versa). Therefore, monthly earnings reflected to a large extent the gap in daily wages.

Relevantly, a technological improvement that was reported in use in one single salina in 1954 —a kind of wheelbarrow to carry salt—spread from the mid-1960s onward to the rest of the region. This spread of technology is likely to have endogenously resulted from the change in the characteristics of the labor force. Indeed, a single worker could now carry, with less effort, three times as much salt as in a basket.

To summarize, the small county of Alcochete and its main economic activity in the 1960s illustrate the general trends analyzed for the country as a whole. A sector that used to rely exclusively on male labor was forced during the 1960s to open up to female employment, as the economy was growing but lacked its traditional human resources to feed that process.

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[36]Alves, conversation; Barroco, conversation.

9 Conclusion

We document the leading role played by demand forces driving the early rise in female labor force participation in Portugal over the 1960s and early 1970s. We show that the relative scarcity of males in the economy, as a result of the military draft and, more relevantly, large migration outflows, unintentionally opened labor market opportunities for women. Most demand shocks in favor of females that have been studied for other countries were partly overturned as men came back from a war. However, the demand shock in favor of females that we study was sustained, as return migration achieved very low values. Also, shortly after the husbands left Portugal, remittances would start coming in. Their considerable magnitude meant a positive income shock for the households involved. This also clearly distinguishes the Portuguese experience from other national experiences, in particular the US. As Goldin and Olivetti (2013) have shown, women whose husbands were away during the WW II were considerably more likely to be employed in 1944 than the women in the same age group whose husbands were not away, partly due to the negative income shock suffered as the husbands were forced to leave their civilian jobs.

We merge different strands of evidence on the overwhelming role played by employer policies: the trend in FLFP was accompanied by declining gender labor market segregation across occupations and industries, and by a closing of the gender pay gap; the marriage market played little role intermediating the process; the trends in Portugal contrasted sharply with Spain and any other Southern European country. Crucially, they were totally opposite to any expectation one might have drawn based on the country's social norms or its legal setting at the time, which clearly aimed at curtailing women's rights and participation. Alternative explanations, such as changes in laws on abortion, contraception, or anti-discrimination, were all absent from the picture in Portugal back when the cohorts under analysis —born 1937 to 1954—took their initial labor supply decisions. Likewise absent from the economy at the time were other mechanisms along which an economy can adjust to the decline in sex ratios: technological progress could make up for the lack of men; society could open up to the entry of male immigrants. Any of those scenarios could have slowed down the pace of increase in the demand for female labor, but none of them operated in Portugal for the cohorts under

analysis to any relevant extent.

Our contribution goes beyond the explanation of the puzzle of high female participation in Portugal. We show that the source of the increase in female employment matters. Strong demand forces can overcome tough social norms, with a positive impact on female labor market integration. Therefore, the existing emphasis on the supply side may be misplaced. Once formal or informal barriers on FLFP are overcome, a self-sustained process can be engendered, as preferences start changing.

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Figures

Figure 1: TRENDS IN FEMALE LABOR FORCE PARTICIPATION, CROSS-COUNTRY COMPARISON, 1960-2000.
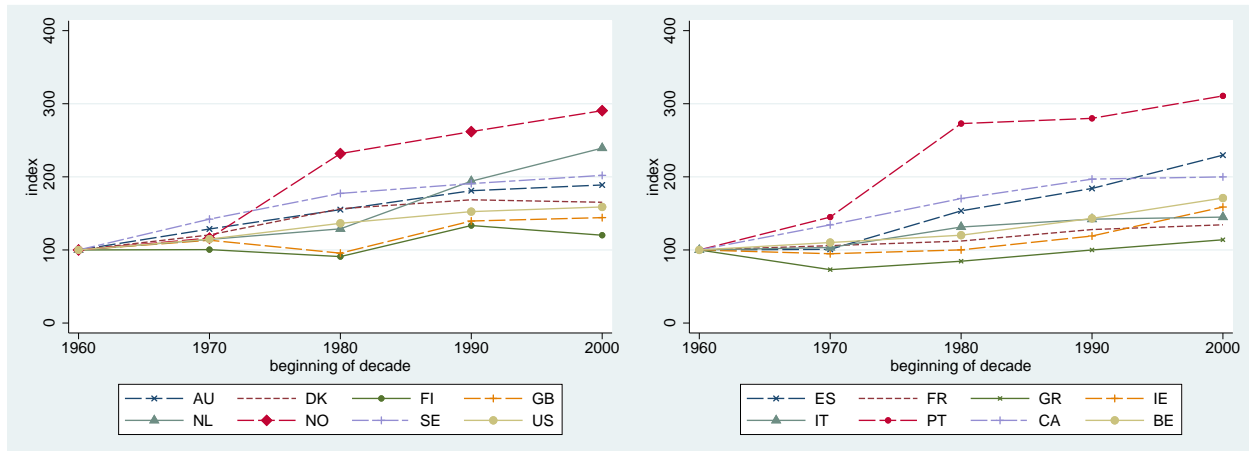
Source: World Bank (2018). Notes: Refers to population aged 15 and older. For each year t, considers the earliest available data, at t or $t+1$. The exceptions are France (1962 and 1975) and Sweden (1965, 1975, and 1982). The index is equal to 100 in each country starting year.

Figure 2: FEMALE LABOR FORCE PARTICIPATION RATE, CROSS-COUNTRY COMPARISON, 1960-2000.
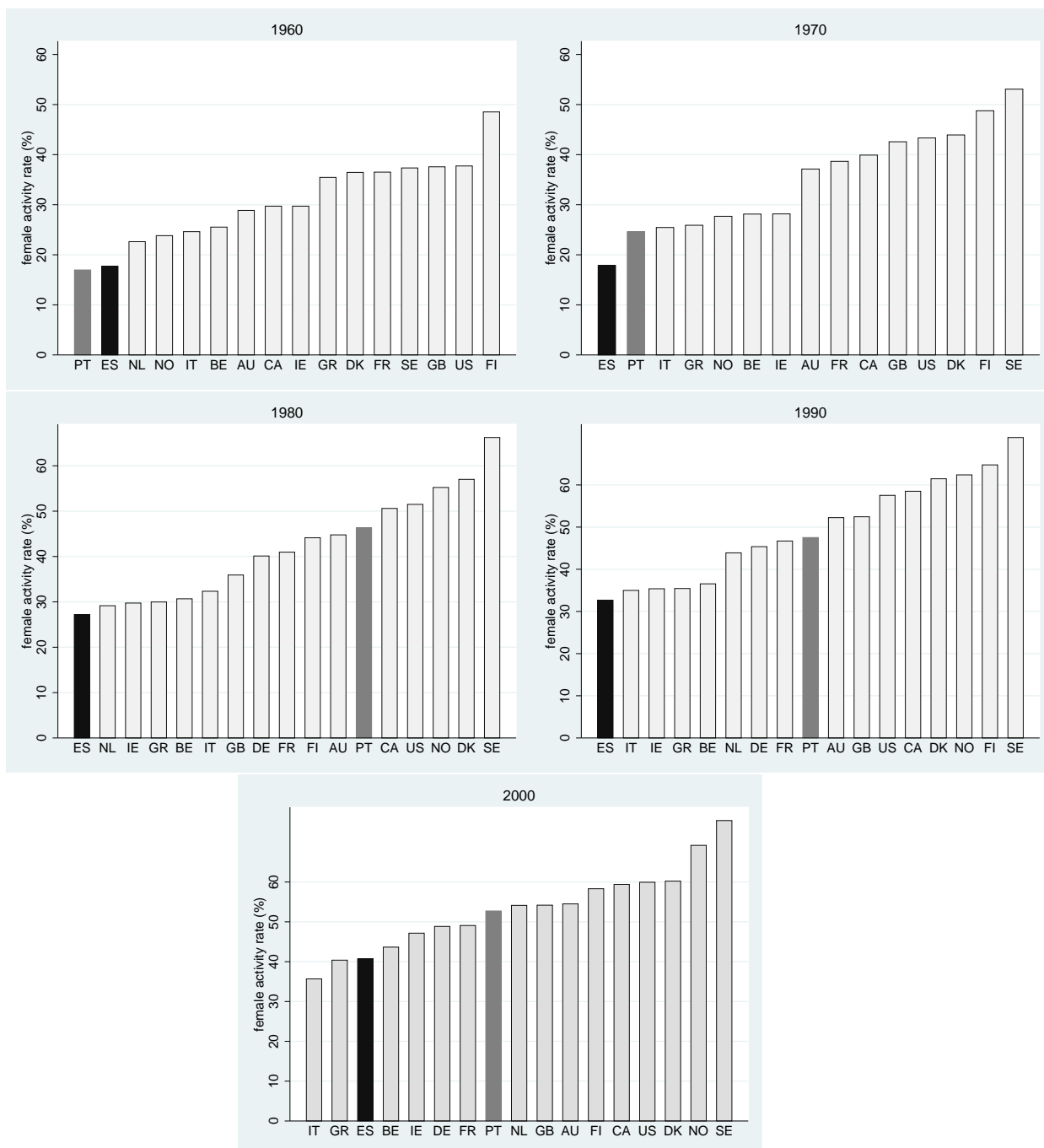
Source: World Bank (2018). Notes: Refers to population aged 15 and older. For each year t, considers the earliest available data, at t or $t + 1$. The exceptions are France (1962 and 1975), Sweden (1965, 1975, and 1982), and Germany (1983). The data for (Federal Republic of) Germany start in 1983. No data reported for The Netherlands between 1960 and 1977.

Figure 3: ACTIVITY RATE, BY BIRTH COHORT AND CENSUS YEAR, SEPARATELY BY GENDER, PORTUGAL AND SPAIN.
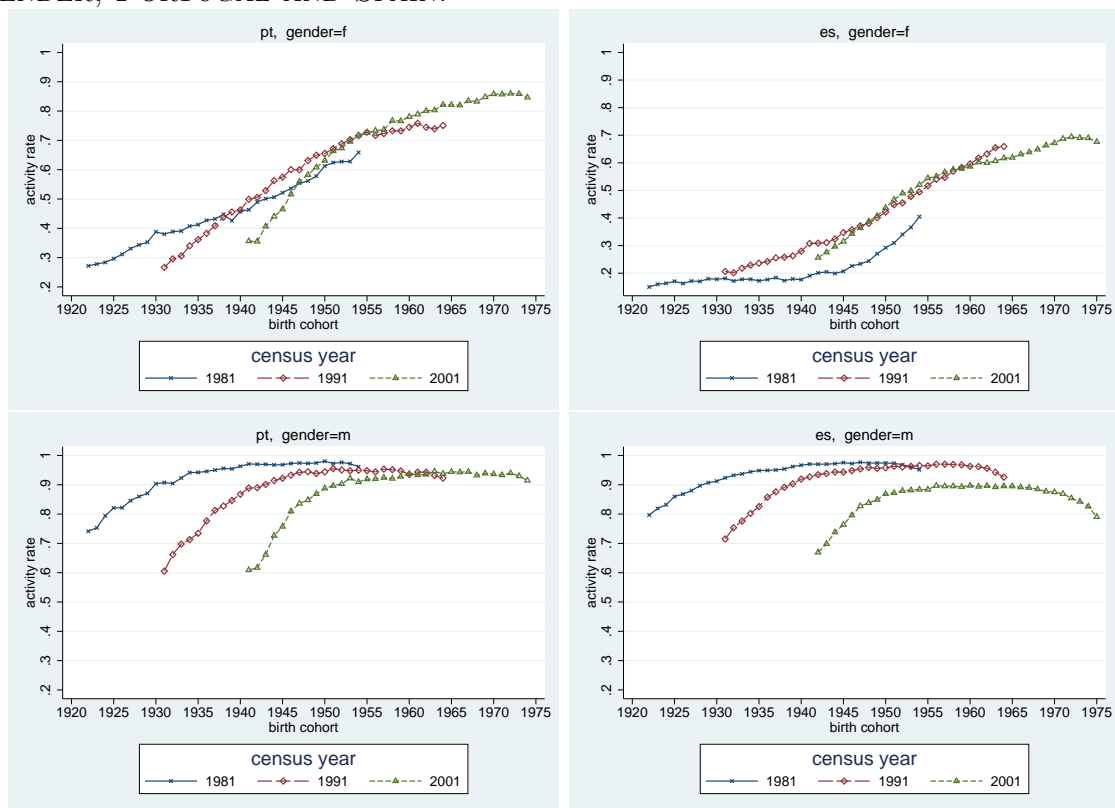
Source: Minnesota Population Center (2015). Note: Cohorts born 1922-1975 observed at ages 26-59.

Figure 4: War fatalities by year of death.
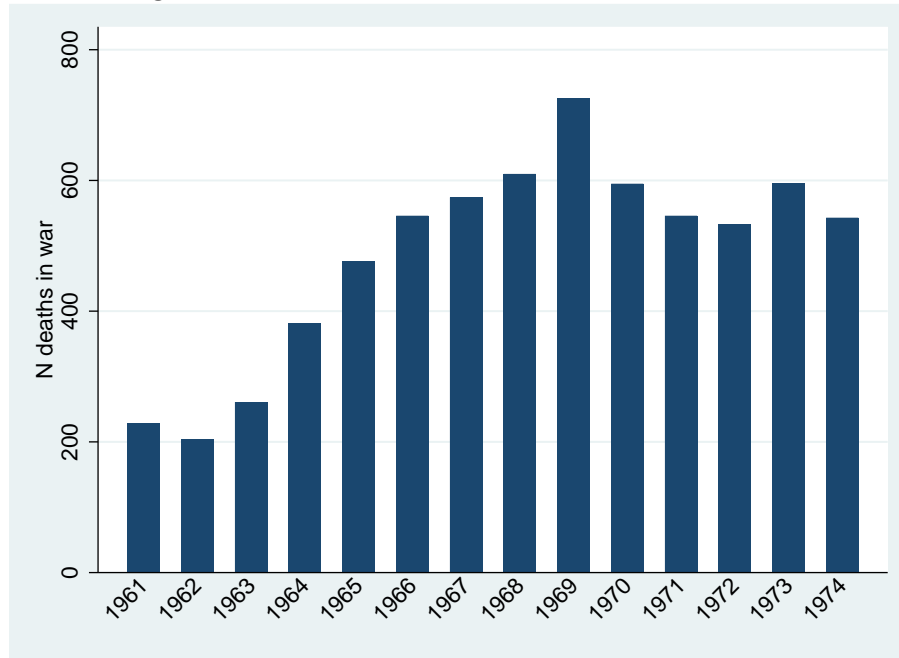
Source: TerraWeb (2016).

Figure 5: Number of war fatalities by birth cohort and rate of war fatalities by birth cohort and region.
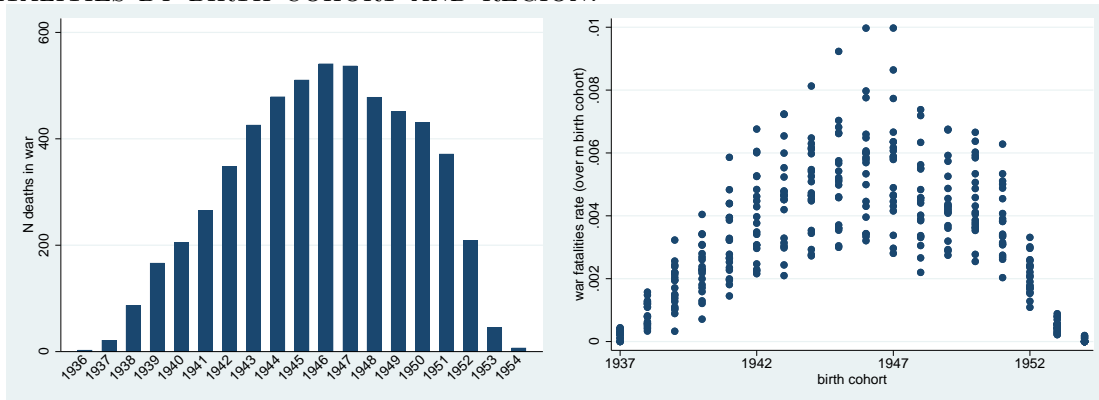
Sources: War casualties - TerraWeb (2016); births - Portugal, INE (2017b); conversion of districts into NUTS3 regions - Portugal, INE (2016), Portugal, DGT (2016), and Pordata (2016). Considers only deaths of soldiers, corporals, and non-commissioned sergeants born in mainland Portugal that occurred in 1961-1974 and were allocated to a birth cohort.

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Figure 6: MALE EMIGRATION RATES, SPAIN VS PORTUGAL.
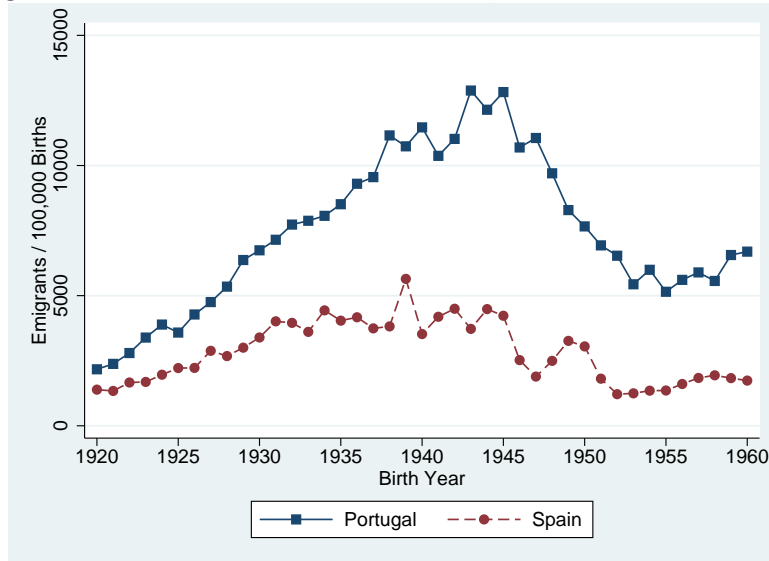
Sources: Minnesota Population Center (2015); Portugal, INE (2017b); Spain, INE (2017). Note: The emigration rate for a particular male cohort is defined as the number of Portuguese (Spanish) male immigrants observed in the Censuses in France 1975 and Germany and Switzerland 1970, divided by the number of births in that male cohort in Portugal (Spain).

Figure 7: PORTUGUESE MALE EMIGRATION RATE, OBSERVED IN FRANCE.
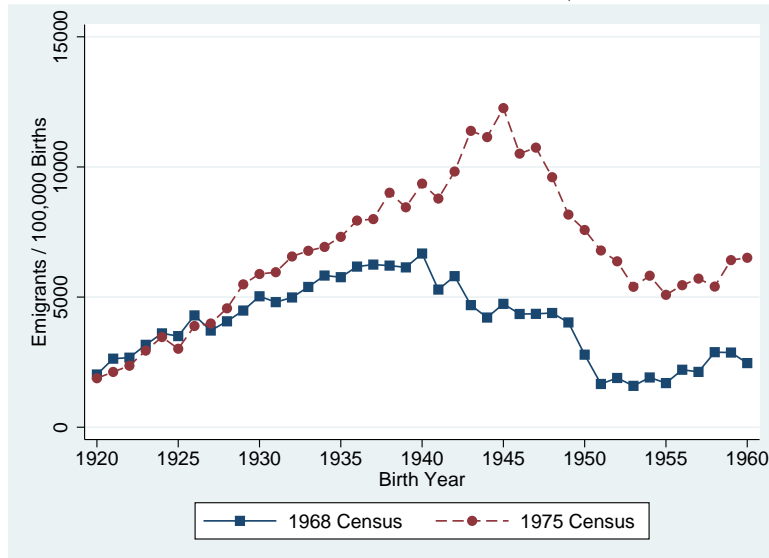
Source: Minnesota Population Center (2015); Portugal, INE (2017b). Note: The emigration rate for a particular male cohort is defined as the number of Portuguese male immigrants observed in the Census in France from the cohort divided by the number of births in that male cohort in Portugal.

Figure 8: Sex ratio among Portuguese and Spanish immigrants, late 1960s.
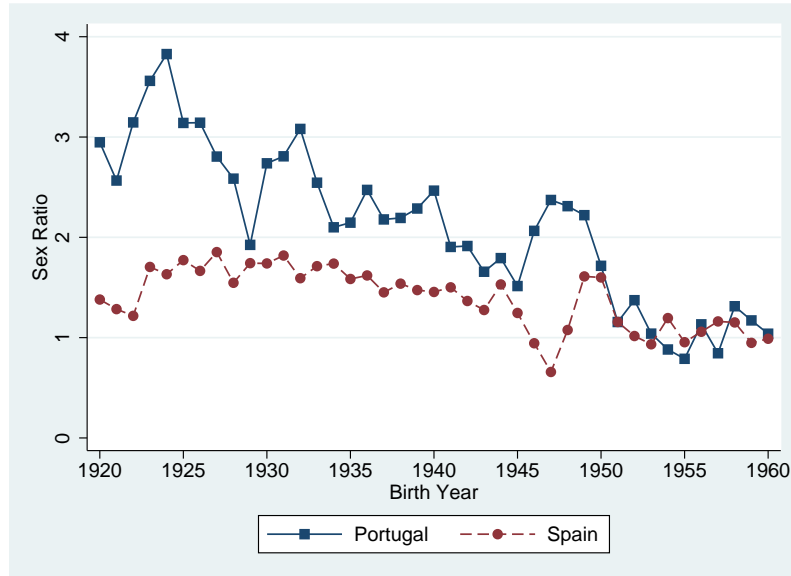
Source: Minnesota Population Center (2015). Note: The sex ratio for each cohort is the number of Portuguese (Spanish) males per female observed in the Census in France 1968 and in Germany and Switzerland 1970.

Figure 9: Employment by gender, two major salina employers, 1971.
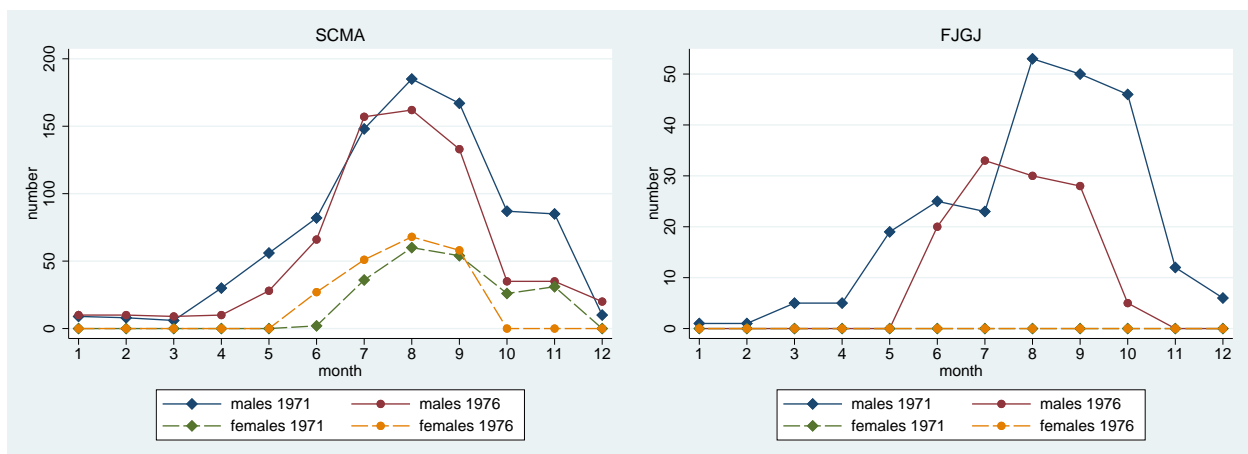
Sources: Santa Casa da Misericórdia de Alcochete (2018) and Fundação João Gonçalves Júnior (2018).

Tables

Table 1: Institutional setting with a gender component, Portugal, 1926-1974.

Year	Policy	Source
	A. Equality before the law	
1933	All citizens are equal before the law, excluding "in the case of the woman, the differences that result from her nature and the good of the family".	Constitution
1971	All citizens are equal before the law, excluding "in the case of gender, the differences in treatment justified by nature".	Constitution
	B. Right to vote	
1927	Only male citizens, if literate or heads of family or living independently.	DL 14802
1931	In national or regional ("município") elections: males, if literate or paying over a certain amount in property or income tax; females, if holding a secondary or tertiary education diploma.	Decrees 19694,20073
	In local ("freguesia") elections: males if head of family or living independently; females if head of family.	
1946	In national elections: males if a) literate or b) paying over a certain amount in property or income tax; females if holding a secondary or tertiary education degree, or heads of family fullfiling condition a) or b), or married (thus not heads of family) and fulfilling condition a) and paying twice the amount set in b) as tax on real estate property (own or joint).	Law 2015
1968	In national elections: all citizens, if literate; as well as those previously registered to vote under Law 2015 of 1946.	Law 2137
	C. Education	
1956	Compulsory schooling: boys 4 years; girls 3 years.	DL 40964
	Starting in 1959, illegal for those without a diploma of 4 years of education to get a job in public admin., a driver's license, or participate in sports competitions; if younger than 21, also illegal to get a job in the services or manufacturing.	
1960	Compulsory schooling 4 years for boys and girls.	DL 42994
	D. Divorce, contraception, abortion	
(1886)	Abortion forbidden.	Penal Code
1940	Divorce forbidden for those married by the Church.	Concordat
1942	Abortion and contraception forbbiden.	DL 32171
	E. Post-1974 revolution changes	
1974	All citizens aged 18 or above entitled to vote in all elections.	DL 621A
1975	Divorce legalized.	Concordat amend.
1976	Equality of all citizens before the law.	Constitution
1976	State has duty to promote dissemination of family planning methods.	Constitution
1984	Abortion allowed under specific circumstances (such as serious risk to the health of the woman, rape, fetus malformation).	Law 6/84
2007	Abortion during first 10 weeks of pregnancy legalized.	Law 16/2007

Table 2: DESCRIPTIVE STATISTICS, PORTUGAL.

Variable	Mean	Std. Dev.
Age	42.96	8.76
Sex ratio at birth (R_{rc}^c)	1.07	0.02
Sex ratio at Census year t (R_{rt}^c)	0.93	0.12
Female participation rate	0.56	0.15
Gini segregation index, occups	0.62	0.09
Gini segregation index, industries	0.55	0.09
Gap real hourly w (logM-logF)	0.29	0.10
(Log) real hourly w, F	1.19	0.27
(Log) real hourly w, M	1.48	0.32
Female ever married rate (over population)	0.92	0.04
Female married, spouse present in hhold (over population)	0.82	0.05
Female average nb. own children in household	1.52	0.52
Female educ high sch. or above rate (over population)	0.13	0.08
Male emigration rate (over birth cohort), time-varying	0.07	0.05
Female emigration rate (over birth cohort), time-varying	0.06	0.05
Male emigration rate, time-invariant	0.08	0.06
Female emigration rate, time-invariant	0.07	0.05
War fatalities rate (over male birth cohort)	0.003	0.002
Nb. of observations	1,000	

Sources: Own computations based on Minnesota Population Center (2015), Portugal, INE (2017b), TerraWeb (2016), and Portugal, MTSS (2009). Note: Refers to cohorts born 1937-1954, observed at ages 26-59 in 1981, 1991, or 2001. Computation of the (time-varying) emigration rate for years 1981, 1991, and 2001 relied on the stock of immigrants from Portugal observed in France in 1975, 1982 and 1990, respectively; for the comparative analysis with Spain, the (time-invariant) emigration rate relied on the stock of immigrants from Portugal observed in France in 1975 and in Germany in 1970 (see the text for details). Computed on cells cohort-region, using as weights the female population in the cell.

Table 3: SEX RATIO, FEMALE LABOR FORCE PARTICIPATION, AND MARRIAGE RATE.

	OLS	IV own coh	IV own+-1	IV own+-2	IV own+-3
	(1)	(2)	(3)	(4)	(5)

A. Female participation

Sex Ratio	-0.085***	-0.283***	-0.312***	-0.272***	-0.323***
	(0.015)	(0.073)	(0.094)	(0.101)	(0.112)
ln Emp	0.218***	0.151***	0.156***	0.152***	0.170***
	(0.020)	(0.057)	(0.053)	(0.054)	(0.057)

First-stage Angrist-Pischke F-stats for participation model
Sex Ratio		18.09	16.34	15.19	13.13
ln Emp		31.37	37.77	41.55	42.47
Overid test p-value		0.95	0.89	0.98	0.99

B. (Ever) Marriage rate

Sex Ratio	0.019***	0.056*	0.057	0.052	0.058
	(0.006)	(0.031)	(0.038)	(0.040)	(0.043)
ln Pop	0.008	0.005	0.008	0.008	0.007
	(0.009)	(0.025)	(0.025)	(0.026)	(0.026)
Overid test p-value		0.52	0.76	0.85	0.93

C. Marriage rate with husband present in household

Sex Ratio	0.026***	0.079*	0.077	0.081*	0.097*
	(0.008)	(0.048)	(0.054)	(0.049)	(0.054)
ln Pop	0.037***	0.051	0.051	0.049	0.052
	(0.012)	(0.038)	(0.035)	(0.035)	(0.036)
Overid test p-value		0.67	0.71	0.73	0.76

First-stage Angrist-Pischke F-stats for marriage models
Sex Ratio		18.78	17.33	16.23	13.99
ln Pop		39.58	47.18	49.29	49.93

N	1,000	1,000	1,000	1,000	1,000

Notes: Under "+- j cohorts", all explanatory variables for cohort c are computed using cohorts c-j to c+j. Instruments - gender composition of emigration, rate of emigration, and rate of male deaths in war. The gender composition of emigration is the rate of male emigration minus the rate of female emigration, either one over the respective birth cohort. The rate of emigration is the number of emigrants over the respective birth cohort. The rate of death in the war is the number of fatal casualties over the respective male birth cohort. All regressions include sets of dummy variables for year, cohort, region, and the interactions year-cohort and year-region. Cell size analytic weight is number of females in the population. Hansen overidentification test. Standard-errors clustered at the region-year level, in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1% .

Table 4: Distribution of active population by occupations, separately by gender, Portugal, Census 1960 to 2011.

IPUMS Standardized Occupation	Occup. Type	Year				
		1960	1981	1991	2001	2011
	(1)	(2)	(3)	(4)	(5)	(6)

A. Relative incidence, M / F (panel C / B)

IPUMS Standardized Occupation	Occup. Type	1960	1981	1991	2001	2011
Legislators, senior officials, managers	blue	3.88	1.04	2.40	1.77	1.72
Professionals	pink	0.25	0.52	0.72	0.62	0.61
Technicians and associate professionals	.	.	.	0.62	0.90	1.15
Clerks	mixed	0.79	0.64	0.59	0.52	0.48
Service workers and shop and market sales	pink	0.28	0.52	0.75	0.58	0.54
Skilled agricultural and fishery workers	blue	2.81	0.87	1.26	1.67	2.35
Crafts and related trades workers	mixed	0.95	1.70	2.03	3.05	4.16
Plant and machine operat. and assemblers	blue	12.90	5.75	1.90	2.37	3.85
Elementary occupations	blue	2.31	4.99	0.50	0.39	0.48
Armed forces	blue	.	176.44	7.35	12.95	5.82

B. Distribution of females by occupation (%)

IPUMS Standardized Occupation	Occup. Type	1960	1981	1991	2001	2011
Legislators, senior officials, managers	blue	0.4	4.3	2.4	4.8	5.0
Professionals	pink	7.6	10.4	6.5	10.5	17.4
Technicians and associate professionals	.	.		9.4	9.9	9.9
Clerks	mixed	6.1	13.4	14.0	15.2	12.1
Service workers and shop and market sales	pink	39.4	27.3	16.1	18.3	26.2
Skilled agricultural and fishery workers	blue	17.6	20.0	7.0	2.8	1.3
Crafts and related trades workers	mixed	28.4	22.8	14.8	10.2	6.3
Plant and machine operat. and assemblers	blue	0.2	1.1	5.8	5.0	2.5
Elementary occupations	blue	0.2	0.8	23.8	23.3	19.0
Armed forces	blue	0.0	0.0	0.2	0.1	0.2

C. Distribution of males by occupation (%)

IPUMS Standardized Occupation	Occup. Type	1960	1981	1991	2001	2011
Legislators, senior officials, managers	blue	1.7	4.4	5.6	8.5	8.6
Professionals	pink	1.9	5.4	4.7	6.6	10.7
Technicians and associate professionals	.	.		5.8	9.0	11.4
Clerks	mixed	4.8	8.6	8.3	7.8	5.9
Service workers and shop and market sales	pink	10.8	14.2	12.0	10.5	14.2
Skilled agricultural and fishery workers	blue	49.4	17.4	8.8	4.6	3.0
Crafts and related trades workers	mixed	27.1	38.8	30.2	31.0	26.2
Plant and machine operat. and assemblers	blue	3.1	6.3	11.0	11.8	9.7
Elementary occupations	blue	0.5	4.0	12.0	9.1	9.1
Armed forces	blue	0.7	0.8	1.6	1.1	1.2

Sources: Distribution of active population by occupation and gender in 1960 - Portugal, INE (2017a); conversion of occupational classification ISCO-58 used in Census 1960 into IPUMS standardized occupation classification - ILO (1969) and Minnesota Population Center (2015); occupational distribution from 1981 to 2011 - Minnesota Population Center (2015).

Table 5: SEX RATIOS, LABOR MARKET SEGREGATION, AND GENDER PAY GAP.

	OLS	IV own coh	IV own+-1	IV own+-2	IV own+-3
	(1)	(2)	(3)	(4)	(5)

A. Occupational gender segregation in QP (Gini Index of Segregation)

Sex Ratio	0.035**	0.162***	0.255***	0.250***	0.282***
	(0.016)	(0.062)	(0.096)	(0.091)	(0.093)
ln Emp	0.031**	-0.025	-0.028	-0.029	-0.034
	(0.015)	(0.040)	(0.040)	(0.040)	(0.042)
Overid test p-value		0.51	0.30	0.33	0.32

B. Industry gender segregation in QP (Gini Index of Segregation)

Sex Ratio	0.032**	0.199**	0.304**	0.286**	0.339**
	(0.015)	(0.088)	(0.123)	(0.122)	(0.133)
ln Emp	0.114***	0.068	0.056	0.065	0.057
	(0.022)	(0.045)	(0.046)	(0.046)	(0.050)
Overid test p-value		0.18	0.13	0.15	0.13

C. Gender gap in real hourly wages (log w M - log w F)

Sex Ratio	0.064***	0.502***	0.730***	0.786***	0.880***
	(0.015)	(0.085)	(0.134)	(0.135)	(0.153)
ln Emp	0.033*	-0.032	-0.048	-0.048	-0.062
	(0.017)	(0.037)	(0.042)	(0.040)	(0.044)
Overid test p-value		0.37	0.26	0.41	0.64
First-stage Angrist-Pischke F-stats					
Sex Ratio		19.44	17.98	19.27	17.11
ln Emp		23.36	22.79	23.81	24.33
N	1,000	1,000	1,000	1,000	1,000

Notes: Under "+- j cohorts", all explanatory variables for cohort c are computed using cohorts c-j to c+j. Instruments - gender composition of emigration, rate of emigration, and rate of male deaths in war. The gender composition of emigration is the rate of male emigration minus the rate of female emigration, either one over the respective birth cohort. The rate of emigration is the number of emigrants over the respective birth cohort. The rate of death in the war is the number of fatal casualties over the respective male birth cohort. All regressions include sets of dummy variables for year, cohort, region, and the interactions year-cohort and year-region. Cell size analytic weight is the level of employment in the respective QP cell. Hansen overidentification test. Standard-errors clustered at the region-year level, in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1% .

Table 6: ROBUSTNESS CHECKS: SEX RATIO, FEMALE LABOR FORCE PARTICIPATION, AND MARRIAGE RATES, INCLUDING CONTROLS FOR EDUCATION.

	OLS	IV own coh	IV own+-1	IV own+-2	IV own+-3
	(1)	(2)	(3)	(4)	(5)

A. Female participation

Sex Ratio	-0.089***	-0.362***	-0.422***	-0.383***	-0.454***
	(0.014)	(0.081)	(0.105)	(0.111)	(0.126)
ln Emp	0.215***	0.155***	0.162***	0.157***	0.175***
	(0.020)	(0.056)	(0.054)	(0.053)	(0.057)
First-stage Angrist-Pischke F-stats					
Sex Ratio		15.89	14.79	13.47	11.08
ln Emp		32.14	38.05	42.17	43.48
Overid test p-value		0.58	0.76	0.58	0.57

B. Marriage rate

Sex Ratio	0.019***	0.059*	0.062	0.056	0.064
	(0.006)	(0.032)	(0.039)	(0.040)	(0.045)
ln Pop	0.008	0.005	0.008	0.008	0.007
	(0.009)	(0.025)	(0.025)	(0.026)	(0.027)
First-stage Angrist-Pischke F-stats					
Sex Ratio		15.96	15.45	14.27	11.73
ln Pop		40.13	48.05	50.78	51.77
Overid test p-value		0.49	0.73	0.81	0.89
N	1,000	1,000	1,000	1,000	1,000

Notes: Under "+- j cohorts", all explanatory variables for cohort c are computed using cohorts c-j to c+j. Instruments - gender composition of emigration, rate of emigration, and rate of male deaths in war. The gender composition of emigration is the rate of male emigration minus the rate of female emigration, either one over the respective birth cohort. The rate of emigration is the number of emigrants over the respective birth cohort. The rate of death in the war is the number of fatal casualties over the respective male birth cohort. All regressions include sets of dummy variables for year, cohort, region, and the interactions year-cohort and year-region. Cell size analytic weight is number of females in the population. Hansen overidentification test. Standard-errors clustered at the region-year level, in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1% .

Table 7: ROBUSTNESS CHECKS: SEX RATIOS, LABOR MARKET SEGRE-
GATION, AND GENDER PAY GAP, INCLUDING CONTROLS FOR EDUCA-
TION.

	OLS	IV own coh	IV own+-1	IV own+-2	IV own+-3
	(1)	(2)	(3)	(4)	(5)

A. Occupational gender segregation in QP (Gini Index of Segregation)

Sex Ratio	0.034**	0.159**	0.253***	0.248***	0.285***
	(0.016)	(0.063)	(0.096)	(0.092)	(0.095)
ln Emp	0.030*	-0.025	-0.028	-0.030	-0.034
	(0.016)	(0.040)	(0.040)	(0.040)	(0.042)
Overid test p-value		0.48	0.27	0.3	0.31

B. Industry gender segregation in QP (Gini Index of Segregation)

Sex Ratio	0.031**	0.199**	0.299**	0.283**	0.344**
	(0.015)	(0.089)	(0.126)	(0.126)	(0.138)
ln Emp	0.113***	0.068	0.056	0.064	0.056
	(0.023)	(0.045)	(0.046)	(0.047)	(0.049)
Overid test p-value		0.16	0.12	0.13	0.12

C. Gender gap in real hourly wages (log w M - log w F)

Sex Ratio	0.061***	0.489***	0.710***	0.773***	0.878***
	(0.015)	(0.088)	(0.131)	(0.135)	(0.157)
ln Emp	0.029*	-0.033	-0.049	-0.049	-0.063
	(0.016)	(0.037)	(0.041)	(0.039)	(0.043)
Overid test p-value		0.30	0.20	0.33	0.60
First-stage Angrist-Pischke F-stats					
Sex Ratio		26.73	16.81	17.85	14.85
ln Emp		25.55	24.18	25.91	26.85
N	1,000	1,000	1,000	1,000	1,000

Notes: Under "+- j cohorts", all explanatory variables for cohort c are computed using cohorts c-j to c+j. Instruments - gender composition of emigration, rate of emigration, and rate of male deaths in war. The gender composition of emigration is the rate of male emigration minus the rate of female emigration, either one over the respective birth cohort. The rate of emigration is the number of emigrants over the respective birth cohort. The rate of death in the war is the number of fatal casualties over the respective male birth cohort. All regressions include sets of dummy variables for year, cohort, region, and the interactions year-cohort and year-region. Cell size analytic weight is the level of employment. Hansen overidentification test. Standard-errors clustered at the region-year level, in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1% .

Table 8: ROBUSTNESS CHECKS: ALTERNATIVE CONCEPTS OF LABOR MARKET SEGREGATION AND GENDER PAY GAP.

	OLS	IV own coh	IV own+-1	IV own+-2	IV own+-3
	(1)	(2)	(3)	(4)	(5)

A. Occupational gender segregation in the Census (Gini Index of Segregation)

Sex Ratio	0.017	0.126	0.167	0.178	0.226*
	(0.020)	(0.093)	(0.103)	(0.114)	(0.133)
ln Emp	-0.169***	-0.318***	-0.339***	-0.344***	-0.362***
	(0.022)	(0.056)	(0.055)	(0.056)	(0.057)
Overid test p-value		0.63	0.58	0.50	0.48

B. Industry gender segregation in the Census (Gini Index of Segregation)

Sex Ratio	0.117***	0.530***	0.615***	0.688***	0.815***
	(0.028)	(0.108)	(0.119)	(0.113)	(0.140)
ln Emp	-0.026	-0.089	-0.111	-0.116	-0.141*
	(0.026)	(0.095)	(0.079)	(0.078)	(0.080)
Overid test p-value		0.53	0.45	0.43	0.48

First-stage Angrist-Pischke F-stats for segregation models

Sex Ratio		17.00	16.14	15.43	13.56
ln Emp		34.48	39.28	41.92	42.25

C. Gender gap in hourly wages including overtime hours and pay (log w M - log w F)

Sex Ratio	0.066***	0.507***	0.740***	0.795***	0.890***
	(0.015)	(0.085)	(0.133)	(0.133)	(0.151)
ln Emp	0.035**	-0.027	-0.044	-0.043	-0.058
	(0.017)	(0.038)	(0.043)	(0.040)	(0.045)
Overid test p-value		0.35	0.25	0.39	0.62

First-stage Angrist-Pischke F-stats for wage gap model

Sex Ratio		19.44	17.98	19.27	17.11
ln Emp		23.36	22.79	23.81	24.33

N	1,000	1,000	1,000	1,000	1,000

Notes: Under "+- j cohorts", all explanatory variables for cohort c are computed using cohorts c-j to c+j. In-struments - gender composition of emigration, rate of emigration, and rate of male deaths in war. The gender composition of emigration is the rate of male emigration minus the rate of female emigration, either one over the respective birth cohort. The rate of emigration is the number of emigrants over the respective birth cohort. The rate of death in the war is the number of fatal casualties over the respective male birth cohort. All regressions include sets of dummy variables for year, cohort, region, and the interactions year-cohort and year-region. Cell size analytic weight is the level of employment (in the Census cell for the segregation indices and the QP cell for the wage gap). Hansen overidentification test. Standard-errors clustered at the region-year level, in parenthesis. * significant at 10%; ** significant at 5%*** significant at 1% .

Table 9: DESCRIPTIVE STATISTICS, SPAIN.

Variable	Mean	Std. Dev.	N
Age	42.81	8.87	2,303
Sex ratio at birth (R_{rc}^c)	1.06	0.02	2,303
Sex ratio at Census year t (R_{rt}^c)	0.99	0.11	2,303
Female participation rate	0.33	0.12	2,303
Female ever married rate (over population)	0.90	0.05	2,303
Female married, spouse present in hhold (over popul.)	0.80	0.05	1,457
Female average nb. own children in household	1.77	0.41	1,457
Female average nb. children ever born	2.17	0.49	1,692
Female educ high sch. or above rate (over population)	0.13	0.07	2,303
Male emigration rate (over birth cohort), time-invariant	0.03	0.03	2,303
Female emigration rate (over birth cohort), time-invariant	0.02	0.02	2,303

Sources: Own computations based on Minnesota Population Center (2015), and Spain, INE (1990; 1991; 2017). Notes: Refers to cohorts born 1937-1954, observed at ages 26-59 in 1981, 1991, or 2001. Computation of the emigration rate relied on the stock of immigrants from Spain observed in Germany and Switzerland in 1970 and in France in 1975 (see the text for details). Computed on cells cohort-region, using as weights the female population in the cell.

Table 10: Sex ratio and female labor force participation: comparison of Portugal and Spain (emigration IV).

	OLS	IV own coh	IV own+-1	IV own+-2	IV own+-3
	(1)	(2)	(3)	(4)	(5)

A. Portugal

Sex Ratio	-0.085***	-0.287***	-0.314***	-0.333***	-0.374***
	(0.015)	(0.084)	(0.096)	(0.109)	(0.118)
ln Emp	0.218***	0.139**	0.143***	0.143***	0.161***
	(0.020)	(0.055)	(0.049)	(0.051)	(0.054)
First-stage Angrist-Pischke F-stats					
Sex Ratio		22.84	21.18	20.17	18.86
ln Emp		31.69	32.42	32.44	34.08
N	1,000	1,000	1,000	1,000	1,000

B. Spain

Sex Ratio	-0.070***	0.405	-0.197	-0.449**	-0.521**
	(0.011)	(0.730)	(0.219)	(0.199)	(0.223)
ln Emp	0.166***	0.310	0.450***	0.531***	0.509***
	(0.016)	(0.271)	(0.145)	(0.139)	(0.110)
First-stage Angrist-Pischke F-stats					
Sex Ratio		2.54	15.12	23.17	24.61
ln Emp		20.79	27.77	23.12	23.08
N	2,303	2,303	2,303	2,303	2,303

Notes: Under "+- j cohorts", all explanatory variables for cohort c are computed using cohorts c-j to c+j. Instruments - gender composition of emigration and rate of emigration. The gender composition of emigration is the rate of male emigration minus the rate of female emigration, either one over the respective birth cohort. The rate of emigration is the number of emigrants over the respective birth cohort. Both instruments rely on the stock of immigrants observed in France, Germany, and Switzerland (in 1975, 1970, and 1970, respectively); however, the Swiss Census is used only for Spaniards, given that it does not separately identify immigrants of Portuguese nationality. All regressions include sets of dummy variables for year, cohort, region, and the interactions year-cohort and year-region. Cell size analytic weight is number of females in the population. Standard-errors clustered at the region-year level, in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1% .

Table 11: Sex ratio and marriage rate: comparison of Portugal and Spain (emigration IV).

	OLS	IV own coh	IV own+-1	IV own+-2	IV own+-3
	(1)	(2)	(3)	(4)	(5)

A. Portugal

Sex Ratio	0.019***	0.029	0.039	0.042	0.040
	(0.006)	(0.034)	(0.039)	(0.040)	(0.045)
ln Pop	0.008	0.033	0.034	0.036	0.040
	(0.009)	(0.026)	(0.026)	(0.027)	(0.027)
First-Stage Angrist-Pischke F-stats					
Sex Ratio		21.41	19.84	19.24	18.27
ln Pop		35.36	35.65	35.61	36.99
N	1,000	1,000	1,000	1,000	1,000

B. Spain

Sex Ratio	-0.001	-0.380	-0.071	-0.089	-0.114
	(0.005)	(0.347)	(0.121)	(0.095)	(0.098)
ln Pop	0.013	-0.121	-0.171	-0.134	-0.071
	(0.009)	(0.160)	(0.132)	(0.148)	(0.132)
First-stage Angrist-Pischke F-stats					
Sex Ratio		1.33	13.04	22.13	23.40
ln Pop		30.34	18.15	11.78	12.37
N	2,303	2,303	2,303	2,303	2,303

Notes: Under "+- j cohorts", all explanatory variables for cohort c are computed using cohorts c-j to c+j. Instruments - gender composition of emigration and rate of emigration. The gender composition of emigration is the rate of male emigration minus the rate of female emigration, either one over the respective birth cohort. The rate of emigration is the number of emigrants over the respective birth cohort. Both instruments rely on the stock of immigrants observed in France, Germany, and Switzerland (in 1975, 1970, and 1970, respectively); however, the Swiss Census is used only for Spaniards, given that it does not separately identify immigrants of Portuguese nationality. All regressions include sets of dummy variables for year, cohort, region, and the interactions year-cohort and year-region. Cell size analytic weight is number of females in the population. Standard-errors clustered at the region-year level, in parenthesis. * significant at 10%; ** significant at 5%; *** significant at 1% .

Online appendix

Can economic pressure overcome social norms?
The case of female labor force participation

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Appendix A – Data

Census data for Portugal, Spain, France, Germany, and Switzerland

For Portugal, we rely on Census data for 1981, 1991, and 2001, and drop the observations from Madeira and Azores (4.8% of observations). The micro data available on the Portuguese Census do not include the year of birth, but instead age at the Census date. We have thus computed the year of birth as the Census year minus age minus 1. Hence, for individuals whose birthday falls between January 1st and the Census day, the cohort will be measured with error (the true cohort being a year later than coded).[1] The number of children ever born is not reported and only the number of own children in the household is available for Portugal. We have information on both the marital status and whether the spouse is present in the household.

For Spain, we similarly rely on Census micro data for 1981, 1991, and 2001. We keep observations from the Spanish mainland and therefore drop the 545,331 observations (5.4% of original sample) from Baleares, Canarias, Ceuta, and Melilla, as the determinants and destination of emigration from those regions are likely to be different. For Spain, both the year of birth and the age at the Census date are reported. We relied on age to define the birth cohort, for consistency with the Census from Portugal, as well as Germany and Switzerland. For Spain, the number of children ever born to a woman is reported in 1981 and 1991; the number of own children living in the household is reported for 1991 and 2001. For Spain, we have information on the marital status, but in 1981 the variable on whether the spouse is present in the household is not reported.

The 1968, 1975, 1982 and 1990 French Censuses data contain information on immigrants in France, their nationality and age (as well as birth year). We use data on

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[1]The exact Census dates in Portugal were 16-Mar-1981, 15-Apr-1991, and 12-Mar-2001. In Spain, those dates were 1-Mar-1981, 1-Mar-1991, and 1-Nov-2001.

France, as it was the overwhelming destination of Portuguese emigrants over the period we cover and a relevant one for Spaniards. We use these data to compute the number of immigrants in France by birth cohort and gender. For an accurate matching with the Census data of the origin country, the definition of birth cohort relies on age at Census date. A caveat in the construction of the sex ratios is that we cannot identify the birth country of respondents who are naturalized. These individuals are not used to compute the sex ratios and numbers of immigrants. Hence, we might be under-estimating the number of immigrants, especially for older individuals, who may have immigrated a long time ago and obtained host country citizenship in the meantime.

We adopt similar procedures for the data from Germany and Switzerland, for 1970 only. Afterward, neither the Spanish nor the Portuguese nationalities are separately coded; in Switzerland, the immigrants of Portuguese origin are not identified in 1970 either.

Computation of sex ratios for immigrants in France

We checked the potential implications of using age instead of year of birth to define the cohorts in our analysis. The French IPUMS data contain both the age and the year of birth of the respondent. Comparing both methods to determine the cohort, we find that it does not materially affect the computation of the sex ratio and emigration rates by cohort.

A second issue relates to the weights used: IPUMS weights all of its observations equally, whereas the French Institut national de la statistique et des études économiques (INSEE) does not. This could have an impact on the measurement of sex ratios for cells with a small number of individuals, such as older cohorts. Using the age of the individual to compute the cohort in either dataset, we acknowledge that both data sets show the same patterns in sex ratios. If anything, the evolution of the sex ratio is slightly smoother in the INSEE data for individuals born in the 1920 and early 1930s.

Conversion of districts into regions in Portugal

For Portugal, the conversion of districts into NUTS3 regions is not straightforward, given that the geographical partition for administrative purposes at the time (district) is not compatible with that for statistical purposes later (NUTS). Actually, a district may split across several regions. Therefore, we have used the information on the resident population by county —*concelho*, a fine geographic partition of the country—, to disaggregate each district into its counties. We then aggregate the counties into NUTS. We thus obtained the share of each district's stock of a variable that should be allocated to each NUTS region.[2] To perform this exercise, we relied on the following sources: for the correspondence county - district, Portugal, Direção Geral do Território (2016); for the correspondence county - NUTS, Portugal, INE (2016); and for the population 1981, Pordata (2017).

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[2]We relied on data for the resident population in 1981.

Conversion of occupational codes in the original Census Portugal 1960 to IPUMS codes

The 1960 Portuguese Census relied on the occupational classification ISCO-58 and the 1981 one relied on ISCO-68. IPUMS provides micro data for the Portuguese Censuses starting in 1981 and converts whichever occupational classification the country's statistical office used into a 1-digit harmonized classification, standard across countries. Crucially, it reports both the country's original 2-digit classification and the IPUMS harmonized 1-digit classification.

Therefore, to identify whether an occupation reported in IPUMS year t was male- or female-dominated as of 1960, we first converted the ISCO-58 classification into ISCO-68 relying on ILO (1969). Having the 1960 employment coded into the classification reported in IPUMS 1981, it was straightforward to aggregate it into the 1-digit harmonized classification and to compute, for each occupation, the relative incidence of female and male employment in 1960 and thus the occupation type.

Appendix B – Institutional setting in Portugal and Spain

Education policies in Portugal

Aiming to reduce the widespread illiteracy rate in the country[3], in 1911 the First Republic raised the compulsory schooling to grade 3 and by 1919 it had further raised it to grade 5. Education was among its priorities, advocating for new pedagogical methods, mixed-gender schools, and modern academic curricula. However, the regime set in place in 1926 and the New State imposed a different orientation. The reduction of illiteracy remained a priority, but it was now understood as the provision of basic reading and writing skills. A conservative view pervaded the educational system, which relied on traditional pedagogical methods and a curricula aimed at instilling nationalism, Catholic moral values, and traditional gender roles.[4] Accordingly, in 1927 compulsory schooling was reduced to four years, a rather unusual direction of change for education policies worldwide. It was further reduced to three years in 1930.[5] Moreover, by 1956 the country had gender-specific compulsory schooling levels —four years for boys and three years for girls.[6]

The law that raised compulsory schooling only for boys also determined a comprehensive set of enforcement conditions: access to jobs in public administration, manufacturing, and the services was forbidden to individuals without a diploma of grade 4, just like the possibility to get a driver's license or participate in official sports competi-

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[3]At 75% in 1910 (Reis, 1993, p. 231).

[4]See for example Decree 27:603 dated March 29, 1937.

[5]This reform first affected the cohort born in 1920.

[6]This reform first affected the cohort born in 1948 (i.e., school entry took place after completion of age 7 and this law rendered education compulsory for ages 7-12 as of December 31, starting in 1957).

tions. The law thus confined women with compulsory education to the agriculture and household spheres. Harmonization of compulsory schooling across gender took place in 1960, when it was raised to grade 4 for girls as well.[7] This change potentially widened the labor market opportunities for women.[8] However, Caillods and Rocha (1983, p.16) argue that the gender-specific compulsory schooling law had a long-lasting impact that could justify a high female drop-out rate upon completion of grade 3, as late as the early 1970s.[9]

Reis (1993: 227-253) provides an insightful discussion of the origins of the low educational achievement in Portugal. He highlights the relevance of one of the explanations by Easterlin (1981) for a State's investment in massive education —the wish to obtain or maintain political, social or economic power. Several examples around the world confirm the schooling system as a crucial tool to unify, under a single state and language, a set of nations with different social, cultural, and language backgrounds, promoting allegiance to a central government. Portugal, having a common language and stable borders since the 13th century, and no social or political tensions comparable to its European counterparts, would have lacked that impetus to massively educate its population.

Laws on voting rights, marriage, divorce, and abortion

The Constitution of 1933 was clear articulating the guiding principle on gender roles in Portugal, as it determined that all citizens are equal before the law, excluding "in the case of the woman, the differences that result from her nature and the good of the family" (art. 5).[10]

The right to vote had been granted in 1911 to citizens over the age of 21 who could read and write and were heads of family. The omission of any reference to gender opened the possibility for *one* woman to vote, after an intricate process and a court case, on the grounds that she was widow and mother, thus head of a family. That oversight by the legislator was soon clarified: regulations enacted in 1913, 1918, and 1927, all made explicit that only male heads of family could vote.[11] Later, in 1931, both gender were recognized the right to vote if fulfilling strict conditions, which were, in any case, different across gender and the scope of the election. In national and regional elections, males were required to know how to read and write or, if they were heads of family, pay over a certain amount in property and income tax; females, instead, were required to have a secondary or tertiary education diploma. In local elections, all males head of family or living independently could vote; in the case of females, only heads of

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[7]This reform first affected the cohort born in 1950.

[8]For a thoughtful analysis of the newspaper coverage of this legal change, the motivations of the government and its unwillingness to advertise the change, see Adão and Remédios (2009).

[9]The sequence of laws referred to in the text are the following decrees: March 29, 1911 (no number); 6:137 of Sept 29, 1919; 13:619 of May 17, 1927; 18:140 of March 22, 1930. They were followed by the decree-laws 40964 of Dec 31, 1956; and 42994 of May 28, 1960.

[10]For a discussion on the social and political context surrounding the evolution of gender-related regulations in Portugal, see Ferreira (2011).

[11]For an informative overview of the process until 1976, see Souza (2013).

family were entitled.[12] A significant change took place in 1968, when both gender, if literate, were allowed to vote in national elections. However, in the regional and local elections, the constraints on secondary or tertiary education and head of a family for females still applied, such that a tiny fraction of that gender was entitled to vote.

Divorce was, rather progressively, regulated for the first time in Portugal in 1910, covering issues such as feasible causes, the distinction between mutual consent or litigious divorce, property division, and support orders. However, the 1940 Concordat, a convention with the Holy See, outlawed divorce for those married after that date by the Church, which were the overwhelming majority. It was not until the 1974 revolution that this regulation was reversed. Contraception was outlawed and so was abortion. The law conferred husbands rights such as denouncing an employment contract signed by their wives without their prior consent and, during most of the period under analysis, women could not apply for a passport without their husband's explicit consent. This entire institutional setting underwent a major turn in the mid-1970s, when the juridical order started catching up with the forefront of international regulations on women's rights. Table 1 in the main text provides a listing of the major policies with a gender focus during the period under study and its change after the 1974 revolution.

Spain

The Second Republic in Spain (1931-1936) was marked by a very progressive agenda, namely regarding gender roles in society and education policies. The Spanish educational system went through a history parallel to Portugal's. Despite the political instability, the two first decades of the 1900s witnessed the expansion of the primary and secondary educational system and investment on teachers' training and salaries (Flecha García, 2011).[13] The Second Republic, from 1931 to 1936, placed emphasis on reducing the high illiteracy rates in the country, while introducing innovative pedagogical methods, modernizing the curricula, developing teacher training, and advocating for mixed gender and secular schools. However, also in Spain, the orientation changed drastically, as elections in 1933 gave power to a conservative and pro-Church government and, more consistently, after 1936 when the Franco regime seized power. Coeducation was abandoned and the new curricula aimed at instilling patriotism, the values of the Catholic church and traditional gender roles (Flecha García, 2011).

In any case, regulations setting minimum education standards were more ambitious in Spain. Already in 1909, compulsory education was raised from age 9 to age 12, and in 1964 it was raised to age 14. Also, starting in the 1950s, a modernization tendency pervaded the educational system. In particular, secondary education was restructured into three cycles, which stimulated the completion of compulsory education by students from lower social backgrounds who did not foresee progressing into higher education. By 1970, a thorough restructuring of the educational system included among its guiding principles the promotion of gender equality of opportunities in education (Flecha

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[12]Decree 19:694 of May 5, 1931 updated by Decree 20:073 of July 15, 1931.

[13]Throughout this paragraph and the next, we rely extensively on Flecha García (2011).

García, 2011).

In Spain, women were allowed to vote in 1924, but only those who were heads of family, in local elections.[14] In 1931, the Second Republic expanded women's voting rights, under a timing that, curiously, the conservative government in Portugal followed as well. However, differently from Portugal, in Spain the right to vote was unambiguously recognized to either gender, with no conditions attached and was thus a *de facto* right.

Spain signed as well a Concordat with the Holy See and was ruled by similar principles on marriage, divorce, contraception, and abortion. The transition to democracy took place in Spain in 1975.

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[14]Decreto-Ley sobre Organización y Administración Municipal, Gaceta de Madrid, 9 marzo 1924, art. 51.

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