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By

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Abstract

Using individual-level data from the *National Family Research of Japan Survey* (1999, 2004 and 2009), we estimate the causal effect of gender social norms on Japanese women's decision to work. Our measure of non-traditional gender social norms is the share of individuals who, at least, somewhat disagree with the statement "*men should work outside and women should look after the family*". Our identification strategy exploits idiosyncratic variation in the share of individuals with non-traditional gender social norms across adjacent cohorts within demographic groups (defined by age group, education level, survey year, and prefecture). We find that a one percentage point increase in share of individuals with non-traditional beliefs increases by 0.016 percentage points the standard deviation of women's decision to work, the equivalent of an increase of 3.3% standard deviation. Our results are robust to a battery of sensitivity analysis and placebo tests. No impact is found on the decision to work part-time.

Keywords: gender social norms, women's decision to work, culture.

JEL Codes: J16, J22, Z13.

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1. Introduction

While the convergence of adult women and men's labor force participation rate in many OECD countries is considered "among the grandest advances in society and the economy in the last century" (Goldin 2014), the plateau or even decline in female participation rates in many countries since the 1990s has brought renewed attention on better understanding the factors driving women's participation in the labor market (Fortin 2005 and 2015; Blau and Kahn 2013). This paper aims at analyzing the causal effect of gender social norms on women's decision to participate in the labor market.

In traditional societies, women's identity focuses on their role as wives and mothers, and they are relegated to working inside the household. If they worked prior to getting married, they usually exit the labor market at marriage as there is substantial social stigma regarding the work of wives outside the home (Goldin 1995). In such context, gender social norms — defined as "acceptable behavioral boundaries for men and women, congruent with the gender division of labor and male power" (Seguino 2007, p. 2) — increase women's costs of deviating from traditionally women's activities. At the same time, putting women in a position of economic dependency on their husbands may make it more difficult for them to deal with the social sanctions that may come with their potential deviation from their assigned gender roles, such as pursuing career goals. As traditional gender norms are relaxed, women move from the private to the public sphere and engage in traditionally male activities including formal education and paid employment in the labor market. To the extent that traditional gender norms affect women's decision to work outside of the household, policies aiming at transforming gender imbalance in power and resources should be an important policy measure seeking to promote female labor force participation.

Empirically, estimating the causal impact of gender social norms is difficult both in terms of the identification strategy and the measurement of gender social norms. Fortin (2005) was among the first to explore the effect of social gender norms on female labor force participation by directly measuring social gender norms with gender role attitudes such as "*being a housewife is just as fulfilling as working for pay*" or "*when jobs are scarce, men should have more right to a job than women*" reported in individual surveys. The author exploited cross-country variation in gender role attitudes across 26 OECD countries, finding that female labor force participation is lower in countries with more traditional gender roles. Despite using lagged attitudes in some specifications, Fortin acknowledges the reverse causality problem and recognizes that many of her estimates capture "partial correlations" rather than "causal factors".[1]

Several authors have addressed the reverse causality problem using different empirical strategies. Fernández (2007), Fernández and Fogli (2009), and Blau et al. (2013) have exploited the fact that second-generation immigrants are born in the country their parents immigrated to and, hence, share their own birth country's laws, labor market regulations and institutions, but differ in their parents' cultural background, including their parent's country-of-ancestry gender social norms. To approximate gender social norms, these authors have used country-level female labor force participation rates. They find a positive relationship between country-of-ancestry female labor force participation and the decision to work of second-generation immigrant women in the US, suggesting that social gender norms from the country of ancestry (transmitted through the parents or the parental social network) determine adult women's labor force participation in the US.[2] Another strategy has been that of Bertrand, Kamenika and Pan (2015), which approximate the traditional gender social norm "*a man should earn more than his wife*" by estimating the likelihood that a married woman would earn more than her husband if her income were a random draw from the population of working women in her demographic group (defined by race, age group, education level and state of residence) using US data from 1970 to 2011.[3] They find that the likelihood that a wife participates in the labor force decreases with the probability that she would earn more than her husband. Most recently, several authors have estimated non-traditional gender social norms with the share of high-school peers' mother who work (Olivetti, Patacchini and Zenou 2018) or who think that important skills for both boys and girls to possess are

[1] Fortin's 2005 analysis uses both individual- and aggregate-level data to measure the outcome variable, namely women's decision to work and female labor force participation, respectively. In another paper, Fortin (2015) exploits 30 years of time variation and focuses only on one country, the US, to study how individuals' *own* beliefs about gender roles affects women's decision to work. She addresses the endogeneity concerns using an instrumental variable approach.

[2] Antecol (2000) conducts a similar analysis using first-generation immigrants instead of second-generation immigrants.

[3] To do so, the authors, first, estimate for each married women a distribution of the wife's potential earnings by assigning her a random draw of the population of working women in her demographic group. The distribution is based on 19 percentiles as the authors estimate it based on every 5th percentile from the 5th to the 95th. Thereafter, using this distribution of potential earnings, they define the likelihood that each married women earns more than her husband with the following formula: $\frac{1}{19}\sum_p 1_{\{w_i^p > husbandIncome_i\}}$.

traditionally masculine ones, such as to think for him or herself or work hard, as opposed to traditionally feminine ones, namely to be well-behaved, popular or help others (Rodríguez-Planas, Sanz-de-Galdeano and Terskaya 2018). As identification strategy, these authors exploit idiosyncratic variation in gender social norms across adjacent grades within schools. They find that socializing in a cohort with a higher share of working mothers or non-traditional mothers during high-school in the mid-1990s in the US increases women's labor supply (Olivetti, Patacchini and Zenou 2018) and reduces the gender wage gap and women's welfare dependency when they become adults (Rodríguez-Planas, Sanz-de-Galdeano and Terskaya 2018).[4]

In the current paper, we follow Fortin (2005) by directly measuring social gender norms with gender role attitudes from individual survey data, in our case from the *National Family Research of Japan Survey* (1999, 2004 and 2009). Our measure of non-traditional social gender norms is the share of individuals who, at least, somewhat disagree with the statement "*men should work outside and women should look after the family*". To address the reverse causality problem, we exploit idiosyncratic variation in the share of individuals with non-traditional gender social norms across adjacent cohorts within demographic groups (defined by age group, education level, survey year and prefecture). We use controls for years of the highest educational attainment, and birth-cohort, survey-year and prefecture-fixed effects, as well as cohort/prefecture time trends to control for unobserved factors that might influence variation in both cohort composition and a woman's decision to work within prefecture. Our conjecture is that after removing education level, birth cohort, survey year and prefecture fixed effects, as well as cohort-specific/prefecture time trends: (1) being in one cohort or another is beyond one's control; and (2) the difference in unobserved heterogeneity across cohorts within an education/survey-year/prefecture cell is not driven by unobserved factors that may also influence a woman's decision to work in the labor market. We provide evidence that this is the case by, first, using Monte-Carlo simulations (as in Lavy and Schlosser 2011) to show that the within education/survey-year/prefecture variation in the share of individuals with non-traditional gender social norms across cohorts is as good as random. Second, we conduct balancing tests showing that this within education/survey-

[4] Rodríguez-Planas, Sanz-de-Galdeano and Terskaya (2018) do not find an effect on female labor force participation.

year/prefecture variation is unrelated to within education/survey-year/prefecture variation in individuals' predetermined characteristics.

We find that a one percentage point increase in share of individuals with non-traditional beliefs increases by 0.016 percentage points the standard deviation of the probability of participating in the labor force, the equivalent of an increase of 3.3% standard deviation, which is smaller but in the range of other estimates of social norms on female labor supply in the US (Olivetti, Patacchini and Zenou 2018; Fernández 2007). Our findings are robust to controlling for individual characteristics as well as many aggregate-level controls at the prefecture/cohort/year level, including labor-demand shifters à la Bartik. In addition, our findings hold to a battery of sensitivity tests, including placebo tests suggesting that it is unlikely that they are confounded by unobserved factors that influence variation in both cohort composition and a woman's decision to work within prefecture.

Analyzing whether social gender norms affect women's decision to work is a highly policy relevant question in a country like Japan with a traditionally low female employment rate.[5] While the proportion of Japanese women aged 25 to 54 employed (as paid employees) soared by 32% during the 1975-2010 period (from 51% to 67.5%), Japan's 2010 female employment rate is dwarfed by those of other high-income countries — 81% in Sweden, 77% in France, 76% in Germany, 75% in the USA or 74% in the UK.[6] Interestingly, behind Japan's modest average hides wide geographical dispersion ranging from as much as 78% of women working in the seven prefectures in the Northern Coastal region to as little as 62% in the prefecture of Nara.[7] In contrast with the trends and variance observed among Japanese female workers, the Japanese male employment rate has remained substantially high over time (over 90%) and with minimal geographical dispersion (Abe 2016).

Our main contribution to the gender-social-norms literature described above follows. We borrow an identification strategy widely used in the field of education, which exploits variation in

[5] For instance, the Prime-Minister's office announced in 2016 several measures to promote female labor force participation.

[6] Source OECD 2017— https://stats.oecd.org/Index.aspx?DataSetCode=LFS_SEXAGE_I_R, and Japanese Population Census.

[7] Data from Census tabulations by Abe (2016) shown in Tables 1A and 1B.

the student composition across cohorts within schools[8], and apply it to the literature on the effects of gender-related cultural dimension on women's labor-market decisions. While one may be concerned that our estimates are biased by the existence of other confounding factors as our analysis is at the education/survey-year/prefecture level (instead of the school level), our empirical analysis shows convincing evidence that variation of our social gender norms variable is as good as random.

The remainder of this paper is organized as follows. Section 2 discusses Japanese background information and data. Section 3 presents the identification strategy and its validity. Section 4 present our findings, robustness checks and placebo test before concluding in Section 5.

2. Background Information and Data

Background Information

Most Japanese studies analyzing female employment focus on labor supply factors including the availability of childcare (Hashimoto and Miyagawa 2008; Unayama 2009 and 2012), the presence of wife's parents or parents-in-law in the household (Ogawa and Ermish 1996; Sasaki 2002; Nawata and Li 2004; Asai, Kambayashi, and Yamaguchi 2015), and the presence of small children and the husband's income (Ogawa and Ermish 1996).

Recently, several authors have suggested that changes in gender social norms regarding female employment may explain the 1990s increase in Japanese FLFP (Mitani 2003; and Kawaguchi and Miyazaki 2009). More specifically, using repeated cross-section from 2000, 2001, 2002 and 2003 *Japanese General Social Survey* (JGSS), Kawaguchi and Miyazaki (2009) find evidence that Japanese men raised by full-time working mothers when they were 15 tend to disagree with statements expressing traditional gender stereotypes such that wife should not work or wife should keep the household.[9] Their findings suggest that mothers' full-time work

[8] See Angrist and Lang (2004); Friesen and Krauth (2007); Hanushek et al. (2002); Hoxby (2000); Lavy and Schlosser (2011); Lavy, Paserman and Schlosser (2012); Bifulco, Fletcher and Ross (2011); and Olivetti, Patacchini, and Zenou (2018).

[9] In the same spirit, Fernández *et al.* (2004) find that US husbands raised by working mothers were more likely to be married to full-time working wives suggesting that husbands' gender stereotypes affect their wives' labor force participation.

experience in adolescence affects their sons' preferences regarding their wife's labor force status.[10] However, their findings on the effect of husband's mothers' full-time work experience on the likelihood that the wife works full time is inconclusive.[11] In a recent study, Abe (2013) concludes that future research may consider exploring the role of "cultural factors" or norms towards women's labor market participation after finding that supply and demand factors do not eliminate regional difference in female labor force participation in Japan.

Data

Our main data set uses individual-level data from the repeated cross-sectional *National Family Research of Japan Survey* (1999, 2004 and 2009). Conducted every 5 years since 1999 by the *Japanese Society of Family Sociology*, this survey aims at making available secondary-use data to conduct research on family sociology in Japan. The survey uses probability sampling to obtain a nationally-representative micro-data set of individuals. The survey collects information on respondents' socio-demographics, household structure, marital status, and gender role attitudes. Because 2009 was the last year the *National Family Research of Japan Survey* collected data on gender role attitudes, we restrict our analysis to the 1999, 2004 and 2009 waves.

Starting from a census of all Japanese-nationality individuals between 28 to 77 years old living in Japan, the *Japanese Society of Family Sociology* uses a two-stage random sampling design to select areas across 47 prefectures and four levels of city sizes, age and gender (in the first stage), and random sampling from registry of the selected areas (in the second stage). The original sample sizes are 6,985 in 1999, 6,302 in 2004 and 5,203 in 2009. We restrict our analysis to women between 28 and 59 years old to focus on prime-aged females who are young enough not to be thinking about retirement. As we want to focus on women old enough to be out of college and since, in Japan, young adults remain in college well into their mid-twenties, the restriction imposed by the dataset of being older than 28 years old is not too binding.

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[10] However, using the *Social Stratification and Social Mobility Survey*, Shirahase (2005) finds that a mother's labor force participation affects neither her sons' nor her daughters' opinion regarding gender roles.

[11] The signs are consistent with Fernández *et al.* (2004) but not statistically significant.

For each woman in our sample, we estimate a variable of non-traditional gender social norms as the share of women in the woman's demographic group who, at least, somewhat disagree with the statement "*men should work outside and women should look after the family*". We assign the demographic group based on age group, highest educational attainment, survey-year and prefecture. By ''age group'' we mean 7 five-year birth cohorts and by ''highest education level'' we mean the following 5 categories: junior high school, high school, vocational school (after high school), junior college, and college. To the extent that, in Japan, the norms that are more relevant to oneself are those of individuals within the same social stratus (Kariya 2012; Kikkawa 2011) and that education is one of the most important proxies of social stratus (Kikkawa 2011), measuring gender social norms at this demographic level is most appropriate. For each woman, the variable measuring non-traditional gender norms is constructed using *only* information on other women in that particular demographic group, that is, we exclude the respondent herself. To eliminate cells in which social gender norms would be imprecisely estimated, we drop those demographic groups with less than 5 individuals. This restriction is common practice (see Fernández and Fogli 2009; Bifulco, Fletcher and Ross 2011; Olivetti, Patacchini and Zenou 2018).

We merge individual-level data with aggregate variables at the survey-year/birth-cohort/prefecture level from different data sources. From the *Japanese Population Census*, we obtain the unemployment rate, the log income per capita, the natural log of the population of women, and the share of three-generation families co-residing in the same household. From the *Japanese Wage Census*, we estimate wages at the survey-year/birth-cohort/industry-level/prefecture level as explained in the results section below. From the *Survey of Social Welfare Institutions* collected by the Ministry of Health, Labor and Welfare, we estimate the ratio of the capacity of childcare centers to the population of females from 25 to 59 years old by prefecture and year.

Table 1 presents descriptive statistics for our sample. Close to two thirds of our sample is employed and about half works full-time. On average, women in our sample are 45 years old and have over 12 years of education, 83% are married and 13% live in a three-generation household. Women in our sample have an average of 1.781 children and 17% have a child under 6 years old. The average spousal income is 5,780,000 JPY. Close to 60% of women in our sample have non-traditional gender role beliefs with a standard deviation of 20%. Moving to aggregate-level data, we observe that the demand shifter averages 61%, ranging between 40% and 85%, the unemployment rate averages 4.9%, ranging between 3% and 7%, and the log(female population) and log(income per capita) are 12 and 8, respectively.

3. Identification Strategy and Validity

Identification Strategy

We exploit variation across birth-cohorts and highest education attainment levels within prefecture and survey year to obtain a causal estimate of non-traditional gender norms on Japanese women's decision to work. To do so, we estimate equation (3) below:

$$Y_{icepy} = \alpha_0 + \alpha_1 NonTraditionalBeliefs_{-icepy} + X'_{icepy}\gamma$$
$$+ Z'_{cpy}\delta + \pi EDUCATION_e + \zeta COHORT_c + \gamma YEAR_y + \theta PREFECTURE_p$$
$$+ \rho\left(COHORT_c * PREFECTURE_p\right) + \varepsilon_{icepy}$$

where Y_{icepy} is equal 1 if woman *i* living in prefecture *p*, from birth cohort *c*, with highest educational attainment level *e* is working in survey year *y*, zero otherwise. $NonTraditionalBeliefs_{-icepy}$ is the share of women with non-traditional beliefs in the same demographic group (defined by age group, education level, survey year, and prefecture) as woman *i* (excluding the respondent *i* herself). X'_{icepy} is a vector of individual-specific covariates measured at survey year *y*, namely age, age squared, marital status, the number of children in the household, whether there are children under 6 years old in the household, presence of grandparents in the household and husband's income.[12] $Z'_{cpy}$is a set of prefecture/year covariates measured contemporaneously such as the annual unemployment rate, the annual natural log of income per capita or the log of the female population , as well as the ratio of female-to-male wages constructed à la Bartik as explained in the results section.[13] We also include controls for years of the highest educational attainment, and birth-cohort, survey-year and prefecture-fixed effects, as well as birth-

[12] As we have 5-year cohort dummies, the age variable controls for variation within cohorts.

[13] The wage ratios are estimated at the industry/cohort/survey year/prefecture level.

cohort/prefecture trends. Standard errors are clustered at the highest educational level, birth-cohort and prefecture level.

Our estimate of interest, α_1 , captures the effect of the share of non-traditional individuals in one's own demographic group on women's decision to work. Identification in this case comes from variation across birth-cohorts (say a 29-year old versus a 30-year old) in the share of individuals with non-traditional beliefs in that same education/prefecture/year cell. Including highest educational attainment dummies and prefecture fixed effects controls for endogenous sorting of individuals across educational groups and prefectures, respectively. To control for time-varying unobserved factors that are also correlated with the share of individuals with non-traditional beliefs and the likelihood that a woman works, we add a full set of prefecture-specific cohort trends, $(COHORT_c * PREFECTURE_p)$. In this case, identification is achieved from the deviation in the share of individuals with non-traditional beliefs from its cohort/prefecture long-term trend.

The variation of the non-traditional gender norms variable within prefecture can be considered as quasi-random if the following two conditions are met. First, being in one cohort or another is beyond one's control. Clearly one does not choose the year (cohort) one is born into. Second, the difference in unobserved heterogeneity across cohorts within an education/prefecture cell for a given survey year is not driven by unobserved factors that may also influence a woman's decision to work in a wage and salary job. Our conjecture is that after controlling for educational attainment, and birth-cohort, survey-year and prefecture fixed effects, as well as cohort-specific/prefecture trends, these two conditions are met. In the next sub-section, we provide evidence supporting this.

Validity of the Identification Strategy

To investigate the validity of our identification strategy, Table 2 shows the amount of variation that is left in our main variable of interest after controlling for highest educational attainment, and birth-cohort, survey-year and prefecture fixed effects, as well as cohort-specific/prefecture trends. Insufficient variation on our variable of interest would lead us to fail to reject the null hypothesis of no effect because of poor precision of our estimates.

Panel A in Table 2 shows descriptive statistics of our main explanatory variable. As discussed earlier, close to 60% of our sample reports, at least, somewhat disagree with the statement "*men should work outside and women should look after the family*". The standard deviation of this gender norms variable is 20%. Panel B shows residuals after removing education, birth cohort, year and prefecture fixed effects. Doing so reduces by 7% the standard deviation of the gender norms variable. Removing the cohort/prefecture trends further reduces the standard deviation of the gender norms variable by 3% (shown in Panel C). Thus, our effect estimates are based on far from negligible changes in the data, which should give us reasonable precision.

In Table 3, we present balancing tests for our non-traditional gender norms variable. Finding that variation in the share of individuals with non-traditional beliefs across birth-cohorts is unrelated to variation in a number of socio-demographic characteristics net of cohort, highest-attainment level, year and prefecture fixed effects, enables us to rule out sorting across prefectures. Panel A in Table 3 shows balancing tests with years of education and cohort, year, and prefecture fixed effects. It reveals that two of our thirteen coefficients are statistically significantly different from zero at the 10% level, which is more than what we would expect by chance, and none are statistically significantly different at the 5% level, which is less than what we would expect by chance. Panel B shows balancing tests with fixed effects as well as cohort/prefecture linear trend. It reveals that three of our thirteen coefficients are statistically significantly different from zero at the 10% level, which again is more than we would expect by chance; but none are significant at the 5% level, which is again less than we would expect by chance. These tests reveal that controlling for education, birth-cohort, prefecture and year fixed effects as well as cohort/prefecture linear trend is likely to be sufficient to isolate variation in education/cohort composition that is not systematically related to women's socio-demographic composition within prefectures.

To show that the within cohort/education/survey-year/prefecture variation in the share of individuals with non-traditional gender beliefs is as good as random, we estimate Monte Carlos simulations as in Lavy and Schlosser (2011). We proceed in three steps. First, we use a binomial distribution to randomly draw a dummy variable indicating beliefs in non-traditional gender roles for each woman in each demographic group. The population mean of the binomial distribution is the mean of non-traditional gender norms in each demographic group. Second, for each woman, we calculate the share of non-traditional women in her demographic group net of her own beliefs. Third, we repeat this process 1,000 times to obtain a 95% confidence interval for the standard deviation of non-traditional gender norms for each demographic group and check if the actual standard deviation is within the 95% interval. We find that 97% of the actual standard deviation in our dataset is within 95% simulated confidence interval, which is good for us to claim that the variation of gender-role belief is random. Figure 1 shows that the actual and simulated standard deviation of the share of individuals with non-traditional beliefs within a cell are very similar.

4. Results

Table 4 presents the main findings from estimating different specifications of equation (1). Column 1 presents a specification that only includes the share of individuals with non-traditional beliefs in the same demographic group as the respondent, years of education dummies, and survey-year, cohort, and prefecture fixed effects. The coefficient of interest, α_1, is positive and statistically significant at the 5% level, indicating that a higher share of individuals with non-traditional beliefs increases the likelihood that a woman is employed in a wage and salary job. Column 2 adds cohort-specific/prefecture trends, which increases α_1 to 0.1091 (also statistically significant at the 5% level). Adding additional individual-level controls decreases slightly α_1 to 0.0940 (shown in columns 3 and 4). The small change in our coefficient of interest α_1 between columns 2 and 4 suggests that omitted individual-level variable bias is unlikely a problem. Interestingly, while we find that marital status affects negatively Japanese women's likelihood of employment, the number of children, conditional on marital status, has a non-statistically significant effect on the likelihood of working.

Estimates in column 4 may be biased if there are other confounding factors that are related with both social gender norms and women's decision to work. More specifically, it is plausible that our variable is capturing structural changes in industry or sector composition across prefectures that may be correlated with changes in female employment. For instance, Abe (2016) analyzes the variance in the employment rate across genders, sectors and prefectures, and finds that changes in the sectoral composition of employment across genders and prefectures are directly related with the convergence of the female employment rates across prefectures. Given Japanese sex segregation by industry (Abe 2013 and 2016)[14], we follow Bartik (1991) and Aizer (2010) and use wage variation in industries dominated by women (or men) to construct measures of exogenous local labor demand for women (or men) as follows.

First, we construct a weighted average wage by gender, prefecture, birth-cohort, and industry for census years 2000, 2005 and 2010 as follows:

$$\bar{w}_{gcpy} = \sum_j \gamma_{gcpj} w_{-pygj} \quad (2)$$

where g indexes gender, c birth cohort, p prefecture, y year, and j industry. γ_{gcpj} is the proportion of female (or male) workers of a given birth cohort c working in industry j in prefecture p from the 1995 Wage Census. Industries are defined on the basis of 5 one-digit industry cells (namely, construction, manufacturing, finance and insurance, retail, wholesale and restaurant, and service sectors). By measuring γ_{gcpj} in 1995, we exclude selective sorting across industry over time from our measure of $\bar{w}_{gcpy}$.[15] w_{-pygj} is the annual gender-specific wage in industry j in Japan excluding the prefecture p in year y. This exclusion prevents our $\bar{w}_{gcpy}$ measure to capture changes in that particular prefecture's industry wages caused by workers' compositional changes.

Provided that national industry gender-specific wage changes (excluding own prefecture industry wage changes) are uncorrelated with gender/cohort/prefecture-level labor supply shocks, this variable will capture plausibly exogenous variation in prefecture employment. This in turn will be true if gender-specific sectoral employment is not too concentrated in any prefecture-cohort-gender cell, a condition that appears satisfied in the data.[16] In addition, because we shall use the deviation of this variable from the national gender-specific wage growth, it is important that there is sufficient variation in the employment composition across prefecture-cohort-gender cells. This condition also appears to be satisfied in the data.[17]

[14] While the Northern Coast of Japan and the prefecture of Chubu have a large share of female workers in manufacturing (25% and 24%, respectively, versus 25% and 34% of male workers); the prefecture of Kansai only has 19% of female workers in manufacturing (versus 26% of male workers) with female workers concentrating in the service sector (36% of female workers versus 21% of male workers). Not surprisingly, the service sector is also strong in Tokyo with a large share of both male (30%) and female (42%) workers employed in it.

[15] Our results are robust to using 1981 weights instead. Results are available from authors upon request.

[16] For example, the maximum shares of workers in prefecture-cohort-gender cell in 1995 are 0.64 percent for 25-29 years old female working in service sector in Tokyo prefecture, and 0.53 percent for 25-29 years old male working in the same sector and prefecture.

[17] In 1995, the standard deviation of the share of workers in service sector across prefecture and cohort is 2.7 percent for male and 2.8 percent for female. The coefficients of variation are 14 percent for male and 18 percent for female.

Second, we calculate the ratio of female-to-male wages constructed according to equation (2) and add it to specification in column 4 in Table 4 as an additional control (shown in column 5). Column 6 adds to the specification in column 5, the unemployment rate, the income per capita and the female population measures at the prefecture/cohort/year level. Doing so has limited impact on our coefficient of interest α_1 that remains 0.0827 in the more complete specification, although we lose some precision as it is now statistically significant at the 10% level. Columns 5 and 6 also show that the local demand affects the likelihood that a woman is working (the coefficient on the wage ratio is 0.334 and statistically significant at the 5% level). When controlling for the wage ratio, the other aggregate variables in column 6 are not statistically significantly different from zero.

Our estimates in all the specifications analyzed up until now show that non-traditional gender norms have an effect on Japanese women's decision to work. More specifically, we find that a one percentage point increase in share on individuals with non-traditional beliefs increases by 0.016 percentage points the standard deviation of the probability of participating in the labor force, the equivalent of an increase of 3.3% standard deviation.[18] In comparison, a one standard deviation increase in the local gender wage ratio results in a 0.035 percentage points increase in the standard deviation of the likelihood that a Japanese woman is employed, the equivalent of an increase of 7.4% standard deviation.[19]

Comparing the size of our non-traditional gender norms coefficient to that of other estimates of gender social norms on female labor supply in the US, we find that our effect is over one half the one estimated by Olivetti, Patacchini and Zenou (2018) or about one-half that estimated by Fernández (2007).[20] Similarly, comparing our coefficient to that estimated by Bertrand, Kamenika and Pan (2015) for married women in the US, we find that ours (0.0827) is a bit more than half the size that of theirs (0.139).

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[18] This is calculated as $\frac{\alpha_2 * NonTraditionalBeliefs_{StDev}}{Y_{StDev}} = \frac{0.0827 * 0.1886}{0.4771} = \frac{0.0156}{0.4771} = 0.0327$

[19] This is calculated as $\frac{\alpha_2 * WAGERATIO_{StDev}}{Y_{StDev}} = \frac{0.3340 * 0.105}{0.4771} = \frac{0.0351}{0.4771} = 0.0736$

[20] Olivetti, Patacchini and Zenou (2017) find that "one standard deviation increase in the average number of hours worked by mothers' of the students in the same school and same cohort translates into an additional 1/20th of a standard deviation in women's weekly hours worked in their late twenties." Fernández (2007) finds that an increase of one standard deviation in the FLFP of parents' source country was associated with an increase of 8% standard deviation in second-generation immigrant women's hours worked in the US.

Using a June 1990 national survey conducted by the Mainichi newspapers, Ogawa and Ermish (1996) examine the factors influencing Japanese married women's participation in the labor force. They find that co-residence with the wife's parents or parents-in-law is directly related to full-time employment as the elderly tend to reduce home time demands on Japanese women. Similarly, Hashimoto and Miyagawa (2008) and Unayama (2009 and 2012) have found childcare availability to affect maternal employment. The specification in column 7 addresses concerns of omitted variable bias because we fail to control for these two dimensions. Indeed, adding the share of three-generation families co-residing in the same household and a measure of childcare availability at the year and prefecture level[21] has little effect on our social-gender-norms estimate. As an alternative robustness check, column 8 controls for whether there is a child under 6 years old in the household, whether the woman lives with grandparents in the household and for her husband's income. The magnitude of the coefficient increases slightly when adding these additional individual-level controls and the coefficient is statistically significant at the 10% level.

Columns 9 to 11 re-estimate specifications in columns 6 to 8 but using a continuous (instead of binomial) measure of non-traditional gender norms. This new variable has four possible values from 1 to 4 with a higher value indicating stronger non-traditional gender norms. Estimates in columns 9 to 11 show that stronger non-traditional gender norms increase the likelihood that a woman decides to work and the effect is statistically significant at the 5% level.

To further check the sensitivity of our results, we use prefecture/cohort panel data from 2000 to 2010 and estimate an aggregate data model using the following specification:

$$\begin{aligned} Y_{pcy} = \beta_0 + \beta_1 WAGERATIO_{pcy} + \beta_2 UNEMP_{py} + \beta_3 INCOME_{py} + \beta_4 NonTraditionalBeliefs_{pcy} \\ + \beta_5 POP_{pcy} + \beta_8 COHORT_c + \gamma YEAR_y + \theta PREFECTURE_p + \pi(COHORT_c * YEAR_y) \\ + \rho(PREFECTURE_p * YEAR_y) + \varepsilon_{pcy} \end{aligned} \tag{3}$$

where each observation is a prefecture-cohort-year cell with *p* indexing prefecture, *c* birth cohort, and *y* year. Our main outcome variable, $NonTraditionalBeliefs_{pcy}$, is now measured at the cohort/survey-year/prefecture level. In addition to controlling for the other aggregate-level variables that we used in the micro-data model, we also control for cohort, year and prefecture

[21] Unfortunately, information on whether they lived in a three-generation household or whether their child attends childcare is not available in the *National Family Research of Japan Survey.*

fixed effects, as well as a full set of cohort-year and prefecture-year linear time trends. Standard errors are clustered at the prefecture level.

Results from estimating equation (3) are displayed in column 12 in Table 4. Column 13 displays estimates from a similar specification as in column 12 but adding controls for share of three-generation family and childcare availability. In both cases aggregate-data findings are consistent with those using individual-level data.[22]

Estimates in column 12 reveal that the estimate on non-traditional gender norms variable, β_4, is positive and statistically significant at the 5% level, indicating that there is a positive association between non-traditional gender norms and female labor force participation within year, cohort, and prefecture. More specifically, the increase in non-traditional gender norms over the 2000-2010 period—an increase of 5.2 percentage points from 51.9% to 57.1%—is associated with 2.1% increase in the Japanese female labor force participation over that same period[23], which increased 3 percentage points from 63.7% to 66.7%.[24] As a comparison, in that same model, over two fifths of the increase in the Japanese female labor force participation over the period 2000-2010 is explained by an increase in the wage ratio of 2.59 percentage points, which is the increase in the actual wage ratio over that period.[25]

Placebo Tests

To investigate the validity of our identification strategy, Table 5 conducts three different placebo tests. In column 1, we replace the actual value of the non-traditional gender norms variable by a randomly selected value from the same prefecture for each cohort/education/prefecture/year cell. This random assignment is done by replacing actual values of these variables with bootstrapped samples with replacement. If our fixed-effects strategy controls for both unobserved characteristics at the year and education/cohort level, then the composition of other cohorts in the

[22] Aggregate-level estimates hold if we add a lagged of the left-hand-side variable, female labor force participation dummy, to address potential omitted variable concerns. Results are available from authors upon request.

[23] This is calculated as $\frac{(0.0121*5.2)}{3} = 0.021$

[24] The female labor force participation estimates are calculated using our sample and hence differ slightly from those mentioned in the Introduction that use the Japanese Population Census.

[25] This is calculated as $\frac{(0.5022*2.59)}{3} = 0.4336$

same prefecture should not have any effect on women's employment choice in column 1 in this placebo regression. Our placebo estimate, shown in column 1, is small in size and not statistically significantly different from zero, suggesting that it is unlikely that our estimates in Table 4 are confounded by unobserved factors that influence variation in both cohort, highest educational attainment and year composition and women's employment choice within prefecture. Column 2 presents a similar placebo exercise where the actual value of the non-traditional gender norms variable is replaced by either that of the cohort right below (that is the younger cohort) than the actual one. Again the placebo estimate is not statistically significantly different from zero, giving weight to the internal validity of our main findings. Column 3 uses the husband's decision to work as left-hand-side variable and finds that non-traditional gender norms has no effect on the spouse's decision to work.

Part-Time Work

Appendix Tables A.1 and A.2 replicate Tables 4 and 5 with the share of women in part-time work as the left-hand-side variable. None of the coefficients on the non-traditional gender norms variable in Appendix Table A.1 tend to be statistically significant different from zero. As reported in the white paper by the Ministry of Health, Labor and Welfare (1998), in Japan, female part-time work has been very much socially accepted since late 1990s. This would be consistent with our finding of no effect of our non-traditional gender norms variable on part-time. The lack of results on the decision to work part-time imply that earlier findings on the decision to work are driven by full-time work.

5. Conclusion

Using data from 2000 to 2010, we estimate the causal effect of non-traditional gender norms on Japanese women's decision to work. To identify local gender norms, we exploit idiosyncratic across-birth-cohort variation in the share of individuals with non-traditional beliefs within the same highest-educational-attainment-level/year/prefecture cell. We find that gender social norms are relevant in explaining Japanese women's decision to work. This result is robust to a battery of sensitivity analysis and placebo tests.

Our findings are highly policy relevant in a country with serious medium- to long-term labor-shortages concerns. They suggest that gender-role beliefs matter for Japanese women's decision to work. Moreover, as we find no evidence that non-traditional gender norms affect the decision to work part-time, the effect is driven by full-time work. Our findings suggest that policies aiming at changing gender roles in Japan would increase female full-time employment. Comparison of the magnitude of the effects of non-traditional gender norms with the effect of the labor demand shifters reveal that policies aiming towards wage gender parity would also be quite effective in getting Japanese women into wage and salary jobs. Hence, measures aiming at improving not only quantity but also quality of jobs for females ought to help promote Japanese women's interest for their careers.

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Table 1. Descriptive Statistics

	Mean	Std. Dev.	Min	Max
Individual-level variables				
Employed	0.650	0.477	0.000	1.000
Working Part-Time	0.483	0.500	0.000	1.000
With non-traditional gender norms	0.587	0.199	0.000	1.000
Age	44.612	9.032	28.000	59.000
Years of Education	12.553	1.248	9.000	15.000
Marital Status	0.827	0.379	0.000	1.000
Number of Children	1.781	1.039	0.000	6.000
Has a child under 6	0.167	0.373	0	1
Lives in a 3-generation family	0.130	0.337	0	1
Spouse's annual income (in 10,000 JPY)	578	286	0	1200
Aggregate-level variables				
Demand Shifter Wage Gap	0.611	0.105	0.401	0.855
Log (female population)	12.299	0.612	10.214	13.252
Unemployment Rate	4.913	0.993	3.000	7.000
Log(income per capita)	8.064	0.173	7.738	8.438
Share of 3-generation families	0.072	0.041	0.023	0.281
Childcare availability	0.057	0.019	0.031	0.138

Notes: Number of observations: 2,758 (1,792 for part-time worker).

Table 2. Variation in Education/Cohort Composition after

Removing Fixed-Effects and Trends

	Observations	Mean	Standard deviation	Minimum	Maximum
Panel A: Raw Cohort/Education or cohort variables					
Share of women with non-traditional beliefs	2,758	0.5874	0.1986	0	1
Panel B: Residuals after removing education, cohort, prefecture and year fixed effects					
Share of women with non-traditional beliefs	2,758	0	0.1847	-0.6186	0.5200
Panel C: Residuals after removing education, cohort, prefecture and year fixed effects					
Share of women with non-traditional beliefs	2,758	0	0.1789	-0.6175	0.5010

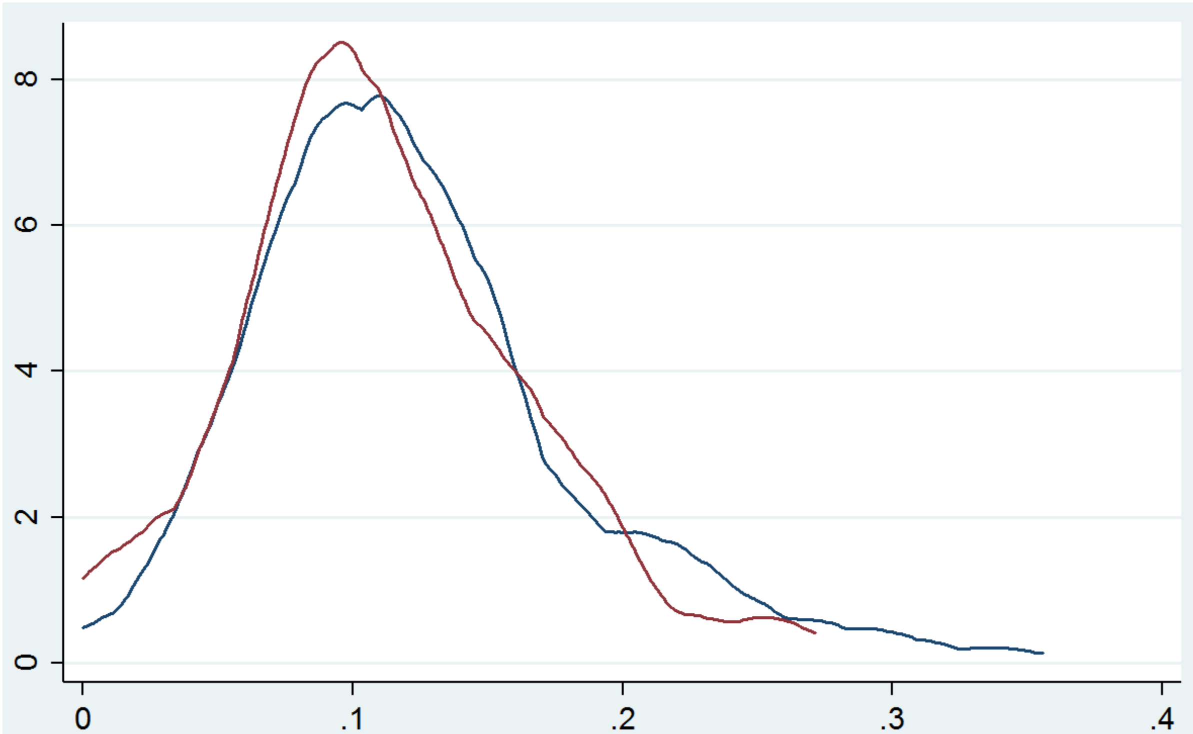
Table 3. Balancing Tests

	(1) Age	(2) Age-squared	(3) Marital Status	(4) Number of Children	(5) Log (fem pop)	(6) Unemp. Rate	(7) Log(income p.p.)	(8) Demand Shifter	(9) Mother's educ_hs	(10) Mother's educ_col	(11) Mother's educ_col	(12) Husband's educ	(13) Own House
Panel A													
Share of Non-traditional Beliefs	-0.0133	-11.0606	-0.0326	0.0882	0.0148	0.1292	-0.0114*	0.0254*	0.0027	-0.0164	0.0015	0.0148	0.0097
	(0.1475)	(19.4186)	(0.0363)	(0.0915)	(0.0204)	(0.0916)	(0.0062)	(0.0148)	(0.0354)	(0.0154)	(0.0089)	(0.1200)	(0.0406)
Panel B													
Share of Non-traditional Beliefs with prefecture-cohort linear trend	-0.0133	-8.7006	-0.0360	0.0736	0.0018	0.1655*	-0.0103*	0.0290*	0.0181	-0.0145	0.0053	-0.0726	0.0136
	(0.1477)	(19.6846)	(0.0370)	(0.0915)	(0.0114)	(0.0913)	(0.0060)	(0.0158)	(0.0359)	(0.0152)	(0.0092)	(0.1244)	(0.0432)
N	2,758	2,758	2,758	2,758	2,217	2,280	2,758	2,758	2,758	2,758	2,758	2,217	2,758

Notes: Standard errors clustered at prefecture-cohort-education level are reported in parentheses.

* 10%, ** 5%, *** 1%.

Figure 1. Actual and Simulated within Cohort/Education/Year/Prefecture Cell in the Proportion of Individuals with Non-Traditional Beliefs



Notes: The figure shows the standard deviation in the share of individuals with non-traditional beliefs for each cohort/education/year/prefecture cell included in the analysis sample (blue line) and the simulated standard deviation in the share of individuals with non-traditional beliefs (red line).

Table 4. Determinants of Women's Decision to Work

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Individual-level data											**Aggregate-level data**	
	Binomial explanatory variable								**Continuous explanatory variable**			**FLFP**	
Share of Non-traditional	0.0998**	0.1091**	0.0925**	0.0940**	0.0853*	0.0827*	0.0781*	0.0952*	0.0481**	0.0474**	0.0561**	0.0120**	0.0121**
Beliefs	(0.0446)	(0.0484)	(0.0447)	(0.0448)	(0.0436)	(0.0436)	(0.0447)	(0.0502)	(0.0193)	(0.0194)	(0.0239)	(0.0050)	(0.0050)
Years of Education	X	X	X	X	X	X	X	X	X	X	X		
Age, marital status			X	X	X	X	X	X	X	X	X		
Num. of children				X	X	X	X	X	X	X	X		
Wage Gap					X	X	X	X	X	X	X	X	X
UR, population and income per capita						X	X	X	X	X	X	X	X
Share of 3-generation families and childcare availability							X			X			X
Has child <6, lives with grandparents, husband's income								X			X		
Prefecture-cohort linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	2,758	2,758	2,758	2,758	2,758	2,758	2,758	2,109	2,758	2,758	2,109	752	752
R-squared	0.0448	0.0558	0.1056	0.1065	0.1074	0.1076	0.1085	0.1547	0.1079	0.1089	0.1552	0.9603	0.9559
Adjusted R-squared	0.0278	0.0301	0.0803	0.0808	0.0814	0.0806	0.0808	0.1201	0.0809	0.0812	0.1206	0.9533	0.9533

Notes: Standard errors clustered at prefecture-cohort-education level are in parentheses. All equations contain prefecture fixed effects, cohort fixed effects, year fixed effects, prefecture-cohort linear trend. Columns 7 and 10 present estimates using equation (3) in the paper. These two specifications are estimated by weighted least squares using female population as weight
* 10%, ** 5%, *** 1%.

Table 5. Placebo Tests

	(1)	(2)	(3)
Share of Non-traditional Beliefs	-0.006	-0.0646	0.0204
	(0.0466)	(0.0659)	(0.0235)
Years of Education	X	X	X
Age, marital status	X	X	X
Num. of children	X	X	X
Wage Gap	X	X	X
UR, population and income per capita	X	X	X
Prefecture-cohort linear trend	Yes	Yes	Yes
Number of Observations	2,758	1,831	2,277
R-squared	n.a.	0.1101	0.1542
Adjusted R-squared	n.a.	0.0747	0.1234

Notes: Standard errors clustered at prefecture-cohort-education level are in parentheses. All equations contain prefecture fixed effects, cohort fixed effects, year fixed effects, prefecture-cohort linear trend. Column 1 reports the mean and standard deviation of the coefficient of share of non-traditional beliefs using the 1000 samples replacing the actual value of the non-traditional gender norms variable by a randomly selected value from the same prefecture and gender but different demographic group (i.e., education, cohorts, and observation year). Column 2 uses instead the measures of the cohort right above (i.e. the younger cohort). Column 3 uses as outcome the husband's decision to work.
* 10%, ** 5%, *** 1%.

Appendix

Gender Social Norms and Women's Decision to Work
Evidence from Japan

Table A.1. Determinants of Women's Decision to Work Part-Time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Individual-level data											**Aggregate-level data**	
	Binomial explanatory variable								**Continuous explanatory variable**			**Part-time rate**	
Share of Non-traditional Beliefs	0.0047	0.0276	0.0331	0.0231	0.0243	0.0207	0.0179	0.0128	0.0115	0.0101	0.0255	-0.0018	-0.0017
	(0.0572)	(0.0574)	(0.0566)	(0.0561)	(0.0561)	(0.0564)	(0.0567)	(0.0673)	(0.0297)	(0.0296)	(0.0350)	(0.0066)	(0.0066)
Years of Education	X	X	X	X	X	X	X	X	X	X	X		
Age, marital status			X	X	X	X	X	X	X	X	X		
Num. of children				X	X	X	X	X	X	X	X		
Wage Gap					X	X	X	X	X	X	X	X	X
UR, population and income per capita						X	X	X	X	X	X	X	X
Share of 3-generation families and childcare availability							X			X			X
Has child <6, lives with grandparents, husband's income								X			X		
Prefecture-cohort linear trend	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	1,792	1,792	1,792	1,792	1,792	1,792	1,792	1,389	1792	1792	1389	752	752
Adjusted R-squared	0.0357	0.0354	0.0693	0.0739	0.0734	0.0719	0.0710	0.0476	0.0719	0.0710	0.0479	0.9863	0.9863

Notes: Standard errors clustered at prefecture-cohort-education level are in parentheses. All equations contain prefecture fixed effects, cohort fixed effects, year fixed effects, prefecture-cohort linear trend. Columns 7 and 10 present estimates using equation (3) in the paper. These two specifications are estimated by weighted least squares using female population as weight

* 10%, ** 5%, *** 1%.

Table A.2. Placebo Tests for the Decision to Work Part Time.

	(1)	(2)	(3)
Share of Non-traditional	-0.0045	-0.0379	-0.0425
Beliefs	(0.0624)	(0.0777)	(0.0281)
Years of Education	X	X	X
Age, marital status	X	X	X
Num. of children	X	X	X
Wage Gap	X	X	X
UR, population and income per capita	X	X	X
Prefecture-cohort linear trend	Yes	Yes	Yes
Number of Observations	1,792	1,207	2,123
R-squared	n.a.	0.1111	0.1014
Adjusted R-squared	n.a.	0.0605	0.0662

Notes: Standard errors clustered at prefecture-cohort-education level are in parentheses. All equations contain prefecture fixed effects, cohort fixed effects, year fixed effects, prefecture-cohort linear trend. Column 1 reports the mean and standard deviation of the coefficient of share of non-traditional beliefs using the 1000 samples replacing the actual value of the non-traditional gender norms variable by a randomly selected value from the same prefecture and gender but different demographic group (i.e., education, cohorts, and observation year). Column 2 uses instead the measures of the cohort right above (i.e. the younger cohort). Column 3 uses as outcome the husband's decision to work.
* 10%, ** 5%, *** 1%.