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**Female teachers' relative wage level in the 1930s and its long-term effects on current views on female labor participation: A case study of Japan**

Abstract

This study analyzes how the historical work status of women contributed to subjective views about female labor participation in Japan. We matched historical and individual-level data. Based on a sample size of almost 10,000, we examined the long-term effect of female teachers' wage level relative to that of male teachers in the 1930s. We find higher female teachers' wages in the 1930s leads to positive views about women's labor participation in 2016; this effect is only observed in the male sample (and not the female sample). By contrast, female teachers' wages in 2013 did not influence the views in 2016.

# 1. Introduction

Similar to developed countries in Europe, Asian countries such as Japan and Korea also have rapidly aging societies. This inevitably results in a reduction in the labor force if only men constitute the primary professional workforce while women look after the household. That is, the traditional division of labor between genders is not suitable for an aging society. Therefore, it has recently become a critical policy issue in Japan to enhance female labor participation. However, according to Schwab et al. (2016), Japanese women's economic participation and opportunity ranks 111th out of 143 countries, which is very low compared with other developed countries. A question naturally arises as to whether women's low social and economic positions persist and cannot be changed due to some kind of inertia. Improvement of women's positions is thought to depend heavily on the view and norms regarding women's role in society. There is argument that a woman's identity does not reduce her burden of housework even if she also works (Akerlof and Kranton, 2000)[1]. However, traditional male views are also considered a key factor in impeding work-style reform and female labor participation. The traditional view has remained relatively persistent even after Japan became a developed country. Japanese women's educational attainment ranks 76th, which is far better than the country's performance in terms of female economic participation and opportunity (Schwab et al., 2016). Women certainly have the intention to learn and accumulate human capital through education. However, social structure formed by men's views is thought to block their participation.

Institutional change and miraculous economic development after World War II appear to have changed Japan's world view. The Gender Equality in Employment Act was enacted in 1986 to promote securing equal opportunity and treatment in employment between men and women. Therefore, there is distinct gap between the social and economic situation in Japan before and after World War II. However, in the 2010s, the position of women is in fact lower than other countries. From this, I infer that people's views have not drastically changed despite institutional change, and so depend on the historical condition. The conditions in the past have gradually changed people's views. In this paper, I attempted to examine women's economic status before World War II, rather than the drastic reforms and change in society in the post-war period. Recently,

researchers have provided quantitative evidence that historical events and conditions influenced educational outcomes in the modern age (West and Woessmann, 2010). Yamamura (2017) found that historical educational level in the 19th century changed the social norms in modern society, leading to the determination of people's views and preferences about economic policy. In terms of creating policies to enhance female labor participation, how the norm regarding women's role formed from the long-term historical view should be investigated. In addition, the higher a female student's average score in mathematics in school, the higher a women's wage, because female students have a higher incentive to learn mathematics to increase their wage in the future (Yamamura, 2019).

Recently, the effects of being surrounded by people of the opposite sex on subjective views have been explored. A son's world view in childhood is influenced by having a full-time working mother, leading them to support female labor participation (Fernandez, et al., 2004; Kawaguchi and Miyazaki, 2009)[2]. Researchers have drawn attention to the influence of gender match between teacher and students (e.g., Holmlund and Sund, 2008; Winters et al., 2013; Lim and Meer, 2017; Sansone, 2017). The present study matched the individual's subjective view about female labor participation in 2016 with historical data on women's wage level in 1933. Using the data, I explore how female teachers were a role model for female workers, and the formation of shared norms in society by comparing men and women's views on female labor participation. A major finding is that, in the past, female teachers were highly evaluated relative to male teachers and this leads men to have positive views about female labor participation in the present day.

The remainder of this article is organized as follows. Section 2 contains the hypothesis. Section 3 describes the data and the method employed in the study. Section 4 presents the estimation results and their interpretation. The final section offers some reflections and conclusions.

## 2. Hypothesis

In Japan, the compulsory education system was enacted in 1886 and was applied to the entire country in 1890[3]. The role of a school teacher, especially in primary schools, is considered a typical job for women. Therefore, it is common for Japanese

children to learn from female teachers and these teachers are widely considered a role model for working women[1]. The wages for female teachers can be considered a proxy for their productivity. Therefore, the higher their wage, the better they can be considered at their jobs. If students learn from a better female teacher who is more highly evaluated in the school, they will have a more positive view about female labor participation. This effect persists, leading students to form progressive views about female labor. I therefore propose the following hypothesis:

*Hypothesis:* Relatively higher wage level of women in the past leads prefer the society where women can display their performance in the work.

A working female role model may have different effects on boys and girls, leading to different outcomes in the future. Having a working woman as a female role model was observed to form boy's views (Fernandez, et al., 2004; Kawaguchi and Miyazaki, 2009). On the other hand, this was found to change girl's views (Tanaka 2008). I compare the effect of historical female teachers' wages on the views and attitudes of men regarding women in the present day.
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## 3. Data and method
## 3.1. Data

To explore the contemporary views on female labor participation, individual-level data were collected via an online survey in July 2016. The Nikkei Research Company (a company with experience in academic research on economics) was commissioned to conduct the web survey. This study gathered a large enough sample of the working-age population for quantitative analysis. The ages of the respondents ranged from 18 to 66 years. The sample size for women (men) is around 5,000. The sampling method was designed to gather a representative sample of the working-age population of Japan. The age range and demographic composition of the sample, shown in Figure 1, is almost

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[1] Teaching is considered as a predominately female profession for years also in the United States (Corcoran et. al., 2004).

equivalent to that of the 2015 Japan Census. The sample used in this paper can be considered representative of the Japanese workplace.

4.2. Features of the data

The definitions and mean values of key variables used for the estimates are shown in Table 1. Respondents were asked, "Do you agree with the opinion that we should form a society in which women can demonstrate their ability and be actively involved in the work place?" The responses could be scored on a 5-point Likert scale ranging from 5 (strongly agree) to 1 (strongly disagree), and are represented by the key variable *Active women*.

We gathered information about respondents' educational background, and also that of their parents. These are quantitative variables to capture the education level. Furthermore, informal education has been called the "hidden curriculum" of schools and has a critical impact on the formation of non-cognitive skills such as cooperation, endurance, and composure (Algan et al., 201; Ito et al., 2014). Following existing research (Ito et al. 2014; Yamamura and Tsutsui, 2019), we used a dummy, *Group learning in primary school*, assigning a score of 1 to experiences of group work in primary school and 0 to the absence of such experiences. In addition, experiences outside school are considered to form students' world view and norms. Experiences of community participation before graduating primary school (under 12 years old) can be important childhood social experiences, teaching children the benefits of working together with various types of people. This is captured by *Social participation under 12 years old*, which ranges from 1 (did not participate at all) to 3 (participated in all community events). Apart from education related variables, various social and economic related information was also collected.

In addition to the original survey, I extracted historical data on wage levels from the "Empire Ministry of Education Annual Report 1933"[4]. The reason for using this data is that the it is the oldest available data on female teachers' wages. Further historical data on population and its density was gathered from the "Population Census 1930." These

were prefecture-level data and enabled the historical data to be matched to individual-level data of the present day using the information on respondent's residential prefecture. Furthermore, we collected current prefectural-level data such as teachers' average wage in 2012 from the Report on School Basic Survey (2012), and per capita income and population from Regional Economic data (Chiiki-Keizai Soran) provided by Toyo Keizai Publishing.

In Figure 2, there is significant difference in the percentage of female teachers before and after World War II. In the pre-war period, only around 7% of teachers were female. After World War II, female teachers accounted for almost half of all primary school teachers in Japan. The percentage of female teachers has remained at over 60% since 1995. This clearly shows that institutional change in Japan after World War II lead to an increase in female labor participation compared to that of men, at least in terms of school teachers. That is, women's economic participation and opportunities were far less than those of men before the institutional change. Figure 3 presents the distribution of the female teacher's wages relative to male teachers between prefectures in 1933 and 2013, and it can be seen that the wage gap between women and men decreased. This is considered to reflect the Gender Equality in Employment Act as a part of the institutional change based on the spread of democracy. It should be noted that variation among prefectures was wider in 1933 than in 2013. In 1933, maximum and minimum values were 0.88 and 0.67, respectively, a difference of 0.21. In 2013, maximum and minimum values were 0.95 and 0.85, respectively, a difference of 0.10. Hence, female teachers' productivity in 1933 varied greatly compared with that in 2013. Scarcity of working women increased the positive externality that female teachers with high ability change the traditional norm. This is the reason female teachers highly evaluated in the labor market provided a role model in the period with low female labor participation.

## 3.2.    Method

The estimated function takes the following form:

*Active women* $_i$ = $\alpha_0$ + $\alpha_1$*Female wage rate 1933* $_i$ (or *Female wage rate 2013* $_i$)

$$+ X'_i B + u_i.$$

The dependent variable is *Active women* $_i$. The key variable is *Female wage rate 1933* $_i$. From the hypothesis proposed in section 2, the predicted sign of $\alpha_1$ is positive. Furthermore, *Female wage rate 2013* $_i$ is included to capture women's wage level. *Female wage rate 2013* $_i$ is thought to be directly associated with people's views of female labor participation. However, *Female wage rate 2013* $_i$ is not considered to capture the long-term effect on formation of norms related to female labor participation. Apart from key variables, the control variables vector is denoted by $X_i$ and the vector of the estimated coefficients is denoted by B. The control variables are dummies for respondent's educational background, parents' educational background, age, number of sisters, brothers, daughters, or sons, having a boy (girl) friend in high school, having a boy (girl) friend in university, marital status, and work status.

Historical level of female wages causes possible endogenous bias. Hence, following the existing research to control the bias of historical variables (e.g., Falck and Woessmann 2013), we conducted the instrumental variables method (IV method) using historical variables as IV. Population density and female population rate in the 1930s are used as instruments for female wage levels, while female population rate and population density in 2010s are also added to the second stage. Population density and female population rate are thought to reflect the labor market conditions, leading to an influence on female wage rate relative to men. In urban areas with high population density, the rate of growth of the service sector was high, especially in 1930 when Japan was a developing country. The service sector was more likely to demand female labor because physical strength is not required. Hence, *Population density 1930* is predicted to have a positive sign. On the other hand, increase in the supply of female labor leads to a decline in female wages. *Female Population rate 1930* is predicted to have a negative sign. However, these past economic conditions are unlikely to influence people's views on female labor participation.

## 4. Estimation results

Tables 2 shows the results of the baseline model. As shown in columns (1) to (3), *Female wage rate 1933* has a positive sign. Furthermore, it is statistically significant at

the 1% level using the full sample and the male sub-sample, although it is not significant using the female sub-sample. On the other hand, *Female wage rate 2013* is not statistically significant in any columns. That is, historical female wage level influenced men's views about female labor participation, but the current level has no effect. Female wage rate does not directly influence men's views but affects their views through formation of norms in the long-term. Men's views have not been influenced by the current market conditions, but by the norms formed before World War II. Apart from the key variables, we observed the significant effect of experience of social interaction through group work and social participation in primary school. This can be interpreted in various ways: these social experiences lead people to have broader views and consider it important to cooperate with people from different backgrounds. It may also suggest that experience of interaction with various types of people leads individuals to evaluate others in terms of ability rather than gender. These derive the argument that people with social experience have the view that women should be more involved in the work place and able to demonstrate their abilities.

Table 3 presents the results of the IV model. In the first stage, *Female wage rate 1933* is the dependent variable, and *Population density 1930* and *Female population rate 1930* show positive and negative signs, respectively. These are statistically significant at the 1% level in columns (1) to (3). These results are as predicted.. In addition, the under- and over-identification tests show the validity of the estimates in all columns. In the second stage, the significant positive sign of *Female wage rate 1933* is persistent in results using the full sample and male sub-sample, but not in those using the female sub-sample. As a consequence, higher wages in the past formed norms that women can work full time and display their abilities in the work place. The mean value of *Active women* is around 3.6 and 3.8 for men and women, respectively, indicating that women are more likely to have a positive view about female labor participation than men. Therefore, there is less likely to be significant change in women's views compared to those of men.. Women have incentive to promote changes in the norm to influence men's views, but are not influenced by the norm. The absolute values of the coefficient of *Female wage rate 1933* are far larger than those in Table 2. Using the male sub-sample, the value is around 2, indicating that a 1% increase in female wages relative to those of men in 1933 leads to a 0.02 point increase of *Active women* on the 5-point scale. Table 1 shows that the mean of *Female*

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*wage rate 1933* is 0.75. Based on this, Figure 4 illustrates the simulation results. It is interesting to observe that the value of *Active women* increased from 3.6 to 4.1 for males, which exceeds 3.8 if *Female wage rate 1933* increased from 0.75 to 1, which that of men in 1933. Based on the male sub-sample, *Active women* becomes almost the same as that based on the female sub-sample when *Female wage rate 1933* is 0.84.

In summary, the proposed hypothesis is strongly supported. Furthermore, full-time female workers as working role models changed the norm shared by society so that men supported female labor participation, which is line with the evidence that a daughter's views are changed by those of her father (Washington 2008; Oswald and Powdthavee, N., 2010) and son's views are changed by those of his mother (Fernandez, et al., 2004; Kawaguchi and Miyazaki, 2009). This paper demonstrates that historical female productivity has a persistent effect on forming norms in the present day.

## 5. Conclusion

The purpose of this paper is to examine how the historical economic status of women contributed to contemporary subjective views about female labor participation in Japan. Due to the compulsory education system, Japanese children receive education right from the primary-school level. As women are far more likely to be employed in schools as teachers, the presence of a female school teacher represents a role model of working women for Japanese students, contributing to their world view.

The study's major findings through OLS and IV estimations are (1) a higher wage for female teachers in the 1930s leads to more positive views regarding female labor participation in 2016, (2) this wage effect is only observed in the estimation using the male sub-sample, but not in the female sub-sample, and (3) female teachers' wages in 2013, however, did not influence the views in 2016.

This implies that women's economic status before World War II has a long-term effect on men's views regarding women's role. Female teachers with a high wage level reflected the fact that female labor was highly valued during the period. Proximity to women in the labor market helped form progressive norms long before institutional changes such as the enactment of the Gender Equality in Employment Act, kicked in. Working female role models in the 1930s contributed to changing men's views about

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female labor participation in 2016. This indirectly improves the work place, making it more flexible for women to cope with both office work and housework, such as child rearing. Not only women but also men eventually support the policy to help parents with child rearing. In the household, husbands cooperate with wives to share the housework. If work-style reform changes the norm, the reform is expected to have an impact not only on society at the present time, but also in the future. Therefore, work-style reform should be designed to make society sustainable by considering the future.

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[1] Croson and Gneezy (2009) reviewed existing works that reported the gender difference of preference.

[2] A mother in full-time employment is a role model for her daughter, which will lead the daughter to work full-time during the child rearing period in the future (Tanaka, 2008).

[3] See official website of Ministry of education, culture, sports, science and technology Japan
.http://www.mext.go.jp/b_menu/shingi/chukyo/chukyo6/gijiroku/attach/1382316.htm.
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[4] Nihon Tteikoku Monbusho Nempo, 1933. (in Japanese).

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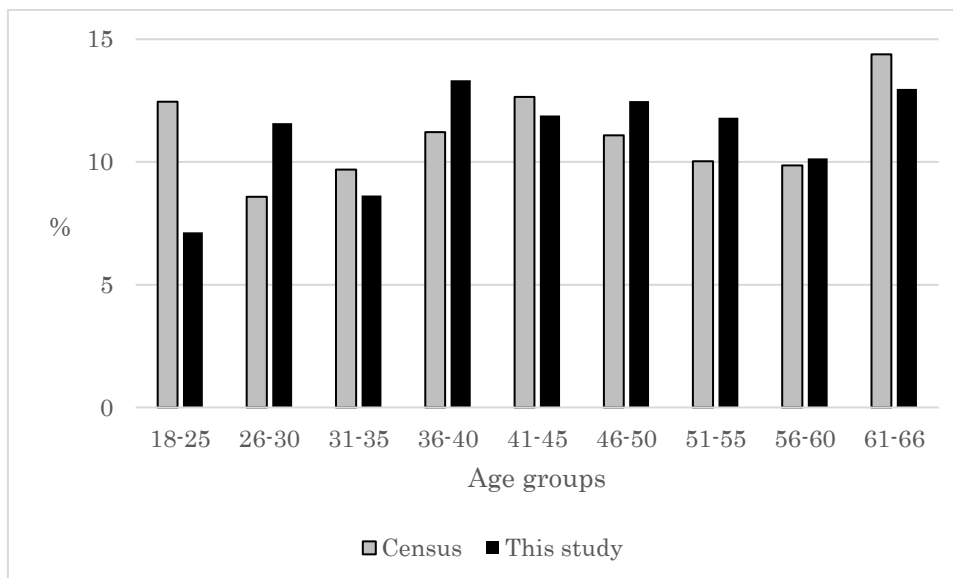
Figure 1. Comparison of the age distribution of this study's sample with that of the 2015 Japan Population Census.
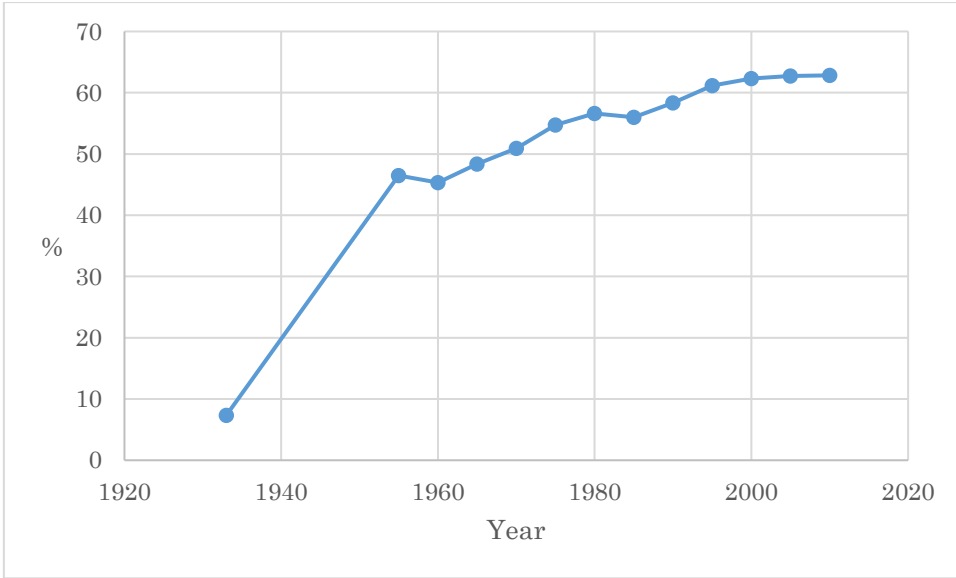
Figure 2. Percentage of female teachers.

Source: "Empire Ministry of Education Annual Report 1933," "Report on School Basic Survey (various years: 1955-2010)"
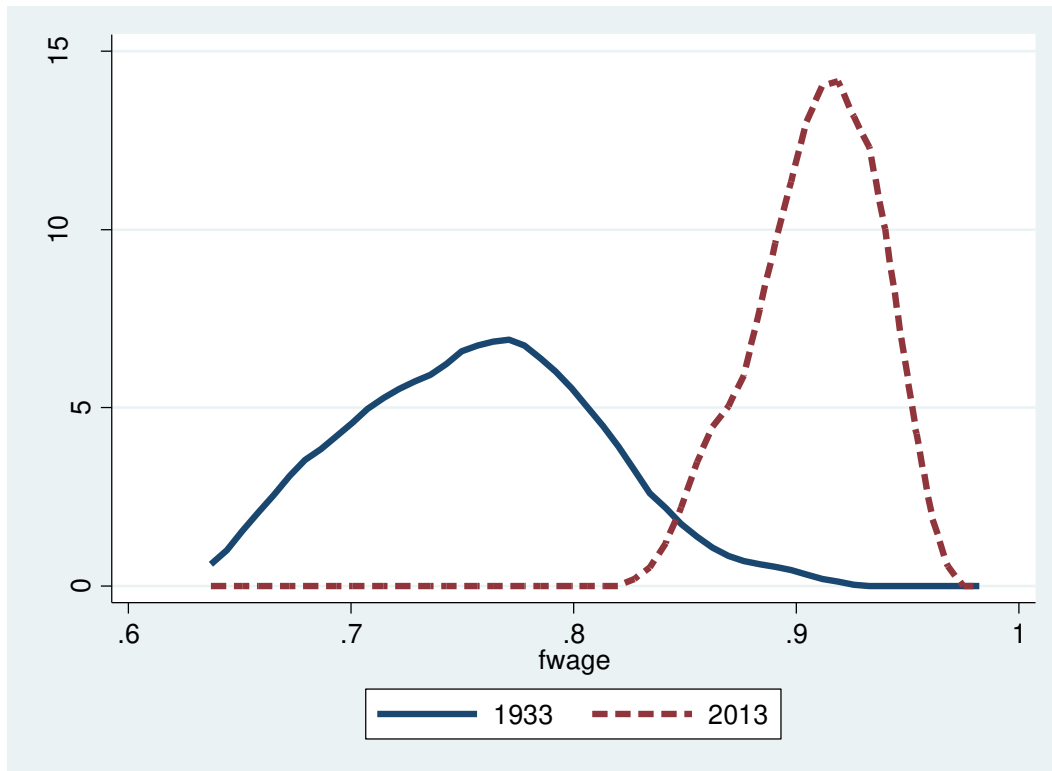
Figure 3. Distribution of female teachers' wage relative to that of male teachers.

Note: Distribution was between 47 prefectures. Kernel density is used to illustrate the distribution.
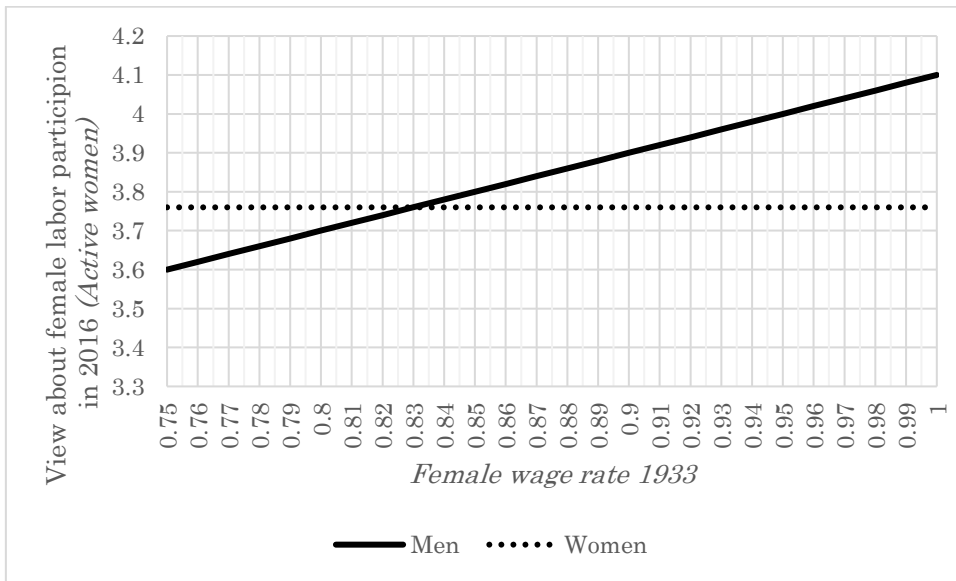
Figure 4. Simulation suggesting change of *Female wage rate 1933* and *Active women.*

**Table 1.** Definition of variables used for estimation and mean values.

| | Definitions | Mean | Max | Min |
|---|---|---|---|---|
| *Active women* | We should form a society in which women can demonstrate their ability and be actively involved in the work place. 5 (strongly agree)- 1 (strongly disagree) | 3.70 | 5 | 1 |
| *Female wage rate 1933* | Female full-time primary school teacher's wage in 1933 / Male full-time primary school teacher's wage in 1933 | 0.75 | 0.88 | 0.66 |
| *Female wage rate 2013* | Female full-time primary school teacher's wage in 2013 / Male full-time primary school teacher's wage in 2013 | 0.90 | 0.85 | 0.84 |
| *Female population rate 1930* | Female population in 1930 / Male population in 1930 | 0.97 | 1.11 | 0.89 |
| *Female population rate 2013* | Female population in 2013 / Male population in 2013 | 1.05 | 1.14 | 0.98 |
| *Ln (population density 1930)* | Log of population density in 1930 | 5.95 | 7.83 | 3.46 |
| *Ln (population density 2013)* | Log of population density in 2013 | 6.78 | 8.71 | 4.17 |
| *Ln (Income per capita 2012)* | Per capita income 2012 | 8.00 | 8.39 | 7.61 |
| *Social participation under 12 years old* | Degree of participation in community activity under 12 years old. 3 (often)-1(never) | 2.13 | 3 | 1 |
| *Group learning in primary school* | 1 if the respondent experienced group learning in primary school, otherwise 0. | 0.43 | 1 | 0 |

**Table 2.** OLS estimation: Dependent variable *Active women*

| | (1) Entire sample | (2) Male sample | (3) Female sample | (4) Entire sample | (5) Male sample | (6) Female sample |
|---|---|---|---|---|---|---|
| *Female wage rate 1933* | 0.64*** | 0.87*** | 0.43 | | | |
| | (2.96) | (2.85) | (1.43) | | | |
| *Female wage rate 2013* | | | | 0.37 | 0.45 | 0.28 |
| | | | | (0.88) | (0.75) | (0.48) |
| *Female population rate 2013* | 0.36 | 0.48 | 0.16 | 0.29 | 0.43 | 0.10 |
| | (1.38) | (1.31) | (1.31) | (1.09) | (1.13) | (0.27) |
| *Ln (population density 2015)* | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| | (1.36) | (1.17) | (0.91) | (0.55) | (0.47) | (0.46) |
| *Ln (Income per capita 2012)* | -0.04 | -0.01 | -0.12 | 0.02 | 0.08 | -0.08 |
| | (-0.66) | (-0.06) | (-1.22) | (0.27) | (0.81) | (-0.73) |
| *Social participation under 12 years old* | 0.07*** | 0.06*** | 0.07*** | 0.06*** | 0.06*** | 0.07*** |
| | (5.55) | (3.49) | (4.44) | (5.32) | (3.49) | (4.34) |
| *Group learning in primary school* | 0.09*** | 0.12*** | 0.06** | 0.09*** | 0.12*** | 0.06** |
| | (5.06) | (4.63) | (2.27) | (5.08) | (4.63) | (2.29) |
| R-Sq | 0.04 | 0.05 | 0.04 | 0.04 | 0.05 | 0.04 |
| Observations | 9,997 | 5,344 | 4,653 | 9,997 | 5,344 | 4,653 |

*Note:** and *** indicate statistical significance at the 5% and 1 % levels, respectively. T-values are the values in parentheses calculated based on robust standard errors. Various control variables are included such as household income, education level, ages, proxy of social capital, number of sisters, number of brothers, number of daughters, number of sons, dummy for having boy (girl) friend in high school, dummy for having boy (girl) friend in university, marital status, and work status. These results are not reported.*

**Table 3.** IV estimation: Dependent variable *Active women*

|  | (1)<br>Entire sample | (2)<br>Male sample | (3)<br>Female sample |
|---|---|---|---|
| *Female wage rate 1933* | 1.18* | 1.99** | 0.50 |
|  | (1.90) | (2.23) | (0.57) |
| *Female population rate 2013* | 0.35 | 0.43 | 0.16 |
|  | (1.36) | (1.18) | (0.46) |
| *Ln (population density 2015)* | 0.01 | 0.02 | 0.01 |
|  | (1.53) | (1.41) | (0.90) |
| *Ln (Income per capita 2012)* | -0.08 | -0.08 | -0.13 |
|  | (-1.02) | (-0.71) | (-1.12) |
| *Social participation under 12 years old* | 0.07*** | 0.07*** | 0.07*** |
|  | (5.57) | (3.71) | (4.34) |
| *Group learning in primary school* | 0.09*** | 0.12*** | 0.06** |
|  | (5.06) | (4.66) | (2.28) |
| *First stage* |  |  |  |
| *Ln (population density 1930)* | 0.02*** | 0.02*** | 0.02*** |
|  | (8.21) | (5.62) | (6.01) |
| *Female population rate 1930* | −0.45*** | −0.45*** | −0.45*** |
|  | (−33.0) | (−23.6) | (−22.6) |
| Under | 998 | 518 | 457 |
| -identification test | P=0.00 | P=0.00 | P=0.00 |
| Over-identification test | 2.04 | 1.76 | 0.33 |
|  | P=0.15 | P=0.18 | P=0.56 |
| Observations | 9,997 | 5,344 | 4,653 |

*Note:*, **, and *** indicate statistical significance at the 10%, 5%, and 1 % levels, respectively. T-values are the values in parentheses calculated based on robust standard errors. Various control variables are included such as household income, education level, age, proxy of social capital, number of sisters, number of brothers, number of daughters, number of sons, dummy for having boy (girl) friend in high school, dummy for having boy (girl) friend in university, marital status, and work status. These results are not reported. The GMM 2SLS model is used from among various IV models. Kleibergen-Paap rk LM statistics are reported for the Under-identification test. Hansen J statistics are reported for the Over-identification test.*