

# Why Taiwan Has Low Gender Wage Gaps: A Comparison with South Korea and The United States

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## Abstract

Despite the similar background, Taiwan outperforms South Korea in gender wage convergence. To determine the reason behind Taiwan women's higher relative wage, I use three micro datasets from Taiwan, South Korea, and the United States to demonstrate a descriptive analysis. My analysis has two findings: First, Taiwan's female workers benefit from higher education attainment and growing relative wages among less-educated. Second, Taiwanese women's wages decline less when they turn to child-bearing ages. My research suggests that the demand for more educated females and the motherhood penalty are critical factors in eliminating gender wage gaps.

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# 1 INTRODUCTION

Taiwan is known for its economic miracle in the last decades of the twentieth century (Gold 2015) and hence listed in the Four Asian Tigers. (See, for example, Page (1994)) Among the Four Asian Tigers, South Korea (hereafter Korea) is the most similar country to Taiwan. For instance, both countries are affected by the Confucious culture. Moreover, they have similar political systems, and both of them have influential electronic manufacturing industry. However, they perform very differently on gender equality. Figure 1 shows the gender wage ratio in Taiwan, Korea, and the United States since 1980.<sup>1</sup> While the gender wage ratios were almost stagnated in Korea and the US, the growth of gender wage ratio in Taiwan sustains for more than three decades, and the Taiwan catches up with the US to have similar gender wage ratio is the most recent decade.

Motivated by the finding in the stylized fact described in Figure 1, my research is to answer that why a constant growth of the gender wage ratio happens in Taiwan, but not in Korea or the US. The change in relative wages is a famous topic in economic literature. For example, Katz and Murphy (1992) found that rapid growth of labor demand for skilled, educated, and females drove the wage structure change during 1963-1987. Juhn, Murphy, and Pierce (1993) found that the growing return to skill contributes to the wider wage gaps between 1963 and 1989. While the literature above focus on overall (or male) wage disparity, gender wage inequality is an equally important issue. Blau and Kahn (2017) provide a thorough discussion of the US gender wage gaps during 1980-2010.

My research has the following contribution. First, I compare the gender wage gaps between East Asia countries and the US. Most of international comparison research pays attention to the *Western* countries (*e.g.*, Blau and Kahn (1992) in the US, Australia, and six European countries, Arulampalam, Booth, and Bryan (2007) in eleven European countries, and Christofides, Polycarpou, and Vrachimis (2013) in 26 European countries.) My research adds to the literature on gender wage inequality of East Asia and connect to the previous research in the US.

Second, I extend the research on gender wage inequality in Taiwan and Korea to 2019 and later. Most of previous research in the two countries covers years before 2000 (*e.g.*, Seguino (2000) and Berik, Rodgers, and Zveglic (2004)). Nevertheless, I observe a change in the

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1. Here I include the US as a baseline country to help the readers understand how Taiwan is different from the US, where the gender wage differentials are frequently discussed in current literature. (See )

differential of gender wage gaps in Taiwan and Korea. My research contribute to the literature by the description and analysis of the change.

With the descriptive and graphical analyses, I have the following findings in my research. First, While the gender wage ratio is higher among college-graduate workers, the gender wage ratio of non-college workers converge much faster. As the female workers become more educated, my finding suggests that the shrinking gender wage gaps are due to convergence within education level and the growth of female education attainment. This finding is consistent with previous research such as the finding of De la Rica, Dolado, and Llorens (2008) in Spain. Moreover, I find that the gender wage ratio of Korean college workers fell during 1997-2010. To my knowledge, this gender wage divergence in Korean is recorded for the first time in literature.

Second, while the gender wage ratios increase across birth cohorts in all the countries, I observe less decline in relative wage of Taiwanese women than Korean women as they turn to the child-bearing ages. My finding indicates that the motherhood penalty described in Correll, Benard, and Paik (2007) does merely happen in Taiwan than in Korea.

Here is the roadmap of the remainder of my paper: Section 2 describes the data I use for the analysis. Section 3 tells about my finding. Lastly, Section 4 concludes my research.

## 2 DATA

In this research, I use different datasets for each of the countries. All the data sources cover at least years between 1980 and 2019. Such a long data coverage allows me to track the trend of gender wage gaps and other characteristics which could affect wage differentials.

The first dataset is the Current Population Survey's Annual Social and Economic Supplement (CPS-ASEC). CPS-ASEC is conducted every March with the main survey of CPS. As much literature<sup>2</sup> uses the CPS-ASEC to discuss the gender wage gaps of the US, I use this data between 1980 and 2021 to provide a baseline of the cross-countries comparison.<sup>3</sup>

The second dataset is Taiwan's Manpower Utilization Survey (MUS). Similar to CPS-ASEC, MUS is an affiliated survey of the Manpower Survey. It was started in 1978 and is conducted every May. I use the data from 1978 to 2019, which is the latest wave released when I start

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2. Such as Juhn, Murphy, and Pierce (1993) and Autor, Katz, and Kearney (2008).

3. I use the five-eighth sample in 2014 to avoid possible complexity from the redesign of the survey.

this research. Similar to CPS, MUS samples in household level and surveys all household members who are in age fifteen or older. The similar sampling method makes MUS to be mostly comparable to CPS-ASEC.

The third data source is Korea's Survey on Labor Condition by Employment Type (SLCET, previously the Survey on Wage Structure). It covers the years between 1980 and 2000. Unlike the other datasets, SLCET is sampled on the establishment level rather than the household level. Therefore, the sample has a smaller universe of the people working in an establishment with five regular workers (ten before 1999) rather than the population, which makes the unemployed or nonemployed labor forces are unobserved. While it may limit the discussion of the labor participation in Korea, SLCET is still valid for my research because I focus on full-time wage workers.

## 2.1 SAMPLE SELECTION

The sample selection mostly follows the processing of March CPS data in Autor, Katz, and Kearney (2008). However, due to the data limitation from MUS and SLCET, I construct the sample slightly differently. First, the sample includes wage and salary workers ages twenty-five to fifty-four. With this age interval, I could mostly avoid the concern of conscription in Taiwan and Korea. Moreover, such an age interval naturally restricts the sample from having potential working experience of more than thirty-nine years, so I do not trim the data by working experience.

The definition of the wage workers is slightly different between the datasets. I define the wage and salary workers as the observation that the wage and salary income is non-missing in CPS-ASEC. In MUS, I treat only employees of the public or private sector<sup>4</sup> as the wage and salary workers. Moreover, those who report no more than 208 regular hours worked<sup>5</sup> in the basis month (*i.e.*, June) are recognized as a wage and salary worker in SLCET.

While CPS-ASEC report weeks worked last year, I did not find any similar variables in MUS and SLCET to identify full-year workers. Therefore, I relax the restriction to include full-time workers rather than full-time, full-year workers. Practically, I define a worker as a full-time worker using the full-time worker flag in CPS. In MUS and SLCET, the full-time worker flag

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4. That is, I exclude the unpaid family workers and self-employed workers.

5. In the eight-hour-per-day basis, 208 regular hours per month means one works more than twenty-six days regularly in a month, which makes one unlikely to be an employee.

does not exist every year, so in the year without the flag, I define workers as full-time workers in MUS if they worked for no less than forty hours last week. In SLCET, I define workers as full-time workers if they worked for no less than 152 hours in the basis month.

## **2.2 SUMMARY STATISTICS**

Table 1 shows the mean and some percentiles of gender wage ratios across the years in each country. As we see in 1, the mean wage ratio grows by fifteen percentage points during 2000-2019 in Taiwan. On the contrary, the growth of mean wage ratio in the same period is less than ten percentage points in Korea and the US. The difference in mean wage ratio growth emphasize how special Taiwan is.

It is worth noticing that Taiwan's smaller gender wage gaps exist across different levels of wage distribution. The gap of wage ratio between 90<sup>th</sup> and 10<sup>th</sup> percentile is around eight percentage point in the US, fourteen percentage points in Korea, but less than two percentage points in Taiwan. With such a small gap, I can say the glass ceiling is not obvious in Taiwan, which provide a further evidence of the gender equality in Taiwan.

Table 2 shows the share of college graduates workers by gender. In Taiwan and the US, females workers are more educated the male workers on average, while it is the opposite in Korea. It tells that the smaller gender wage gaps in Taiwan (comparing to Korea) partially comes from higher human capital stock of female workers. I will further discuss the relationship between education attainment and gender wage gaps in later sections.

## **3 RESULTS**

### **3.1 GENDER WAGE GAPS AND EDUCATION**

Figure 2 shows the gender wage gaps by college attainment. In general, I do not observe clear gender wage convergence happens within college-graduate workers. On the other hand, female non-college workers gain considerably from the rising gender wage ratio.

It is not very surprising because the gender wage ratio of college-graduate workers is relatively high. It is difficult to see a further progress on this group of workers. Also, we see in Table 2 that the gender education gaps of workers are shrinking in all countries. The narrower education

gap may suggest stronger supply of female college-graduate workers and relatively fewer supply of female non-college workers. The change in supply may cause the difference in growth of gender wage ratio between different levels of education attainment.

Surprisingly, I find that the gender wage ratio of Korean college-graduate workers was falling during the first decade of the twenty-first century, whereas I find the wage ratios of college-graduate workers are stagnated during the same period in Taiwan and the US. A possible reason is that the growth rate of college-graduate female labor supply increased much faster in Korea than in the other countries. Figure 3 shows that the employment growth of female college-graduate during 2000-2010 is more than fifty percent, while this number is less than twenty percent in Taiwan the US. A stronger female supply may enlarge the glass ceiling and thus widen the gender wage gaps between educated workers.

### **3.2 GENDER GAPS IN DIFFERENT COHORTS**

One advantage of using long time-span datasets (in this research, the data covers forty years) is that it allows us to observe people from different birth cohorts. Since I observe sounding changes of gender wage gaps across the years, I expect to see regrading change of gender wage gaps across the birth cohorts.

Figure 4 shows the gender wage ratio in different ages and by different cohorts born between 1940's to 1980's. I find that the relative wages of female workers decline during their child-bearing age in all the countries. It is reasonable and recorded in literature [NEED CITATION] since most of female workers have their career interrupted due to pregnancy and child-bearing. Furthermore, female are generally expected to bear the burden of child-caring more than their spouse, which make them spend less time on their job. It is also supported by the fact that the relative wages of female workers rebound as they get older and no longer need to take care of their children. Fortunately, I find that the relative wages of female workers grow across the cohorts in almost all ages. This finding is consistent with the fact that the gender wage gaps are narrowing across the time.

Despite the similar trends of wage ratio across the countries, there are some country-specific fact that is worth to point out. In Taiwan, the fall of wage ratio from ages 25-30 to ages 35-40 is about fifteen percentage points within the 1940's and 1950's cohort. However, the falls almost

vanish within the 1960's and younger cohorts, and the relative wages of the 1970's and younger cohorts catch up with their US counterparts. In other words, the relative wages of Taiwanese female workers in and after child-bearing age have sizeable increases across the years.

Figure 5 further reveals the pattern of wage ratios across ages and cohorts by college attainment. While the gender wage ratios of Taiwanese college-graduate workers are stably at around ninety percentage points within each cohort in different ages, the gender wage ratios of Taiwanese non-college workers increase cohort by cohort. The different trend and level of relative wage explains that the relative wage growth of Taiwanese female workers in and after child-bearing age comes from the two factors: one is the increase of female education, and the other is the gender wage ratio increases within less-educated workers.

In Korea, on the contrary, the falls of wage ratio since ages 25-30 are still large (up to almost forty percentage points), and the falls continue to ages 40-45 or even later. Moreover, the falls keep happening on young cohorts. Comparing to the US, the gender wage gaps in Korea shrink faster across the cohort but widen more as the workers getting older. The two effects in the opposite direction explain that the gender wage gaps show similar patterns in both Korea and the US in recent decades.

I further investigate the pattern of wage ratios across ages and cohorts by college attainment in Korea. Figure 5 shows that, unexpectedly, the relative wages of Korean female college-graduate workers are lower in the 1960's and younger cohorts after they turn to thirty-five years old. This astonishing finding may because of the rapid increase of female college-graduates supply. In Figure ??, I find that although the shares of female college-graduate workers are relatively low, they increase steadily over cohorts. The female share of college-graduate workers is almost tripled in the 1960's cohort comparing the 1940's cohort. Such a boosting female labor supply may cause that Korean female workers from younger cohort perform worse in relative wage.

## 4 CONCLUSION

With the micro data from Taiwan, South Korea, and the United States, I analyze that trend of gender wage gaps in the three countries between 1980 and 2019. My research concludes with two primary findings. First, the long-lasting gender wage convergence in Taiwan benefits from

both the rapid growth of female education attainment and the significant increase of gender wage ratio within less-educated workers. My finding on gender wage gaps by education implicates that although education help female to earn more, the demand and supply on labor market could restrict the return on education of female workers. Second, the relative wage of Taiwanese women gets higher along the birth cohort, and Taiwanese women suffer less from wage decline in child-bearing age. My findings may partially explain why Taiwan is on a different path of gender wage convergence in the last two decades. My finding on gender wage ratio by ages and cohort suggests that it is critical to reduce the child penalty on women when the government tries to eliminate the gender wage differentials.

There are several limitations on my research. First, the sample of Korean data (SLCET) is not the population. The restricted sample makes my findings in Korea is less comparable to other results. A possible solution is to trim the sample of Taiwan and US data to be compatible with Korea data. However, data attrition may cause selection bias and harm the internal validity. Therefore, I choose to use the full Taiwan and Korea sample. The level of selection bias from data attrition can be discussed in future research. Second, the inconsistency of datasets between different countries and years of survey prevents me from discussion of other factors that can affect gender wage inequality. For example, working experience is reported in CPS but not in the other two datasets. There is trade-off between different data sources. While I believe that the data I use fits this research the best, my finding can be examined with different data sources in future research.

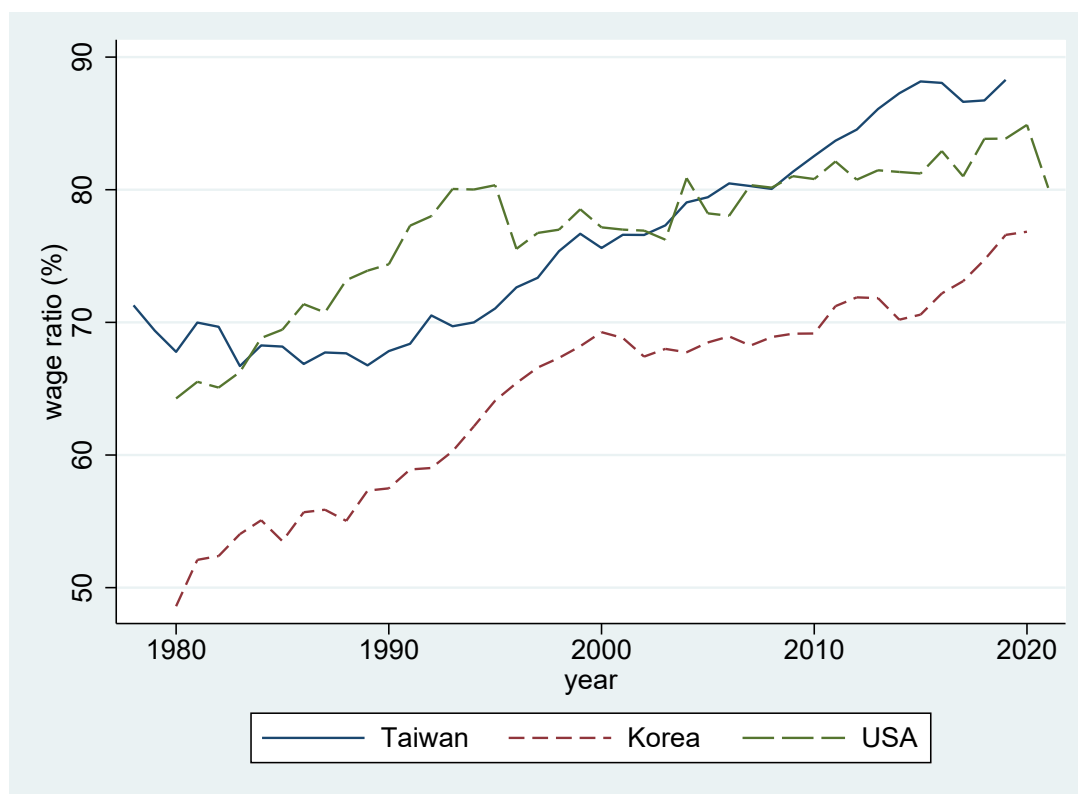


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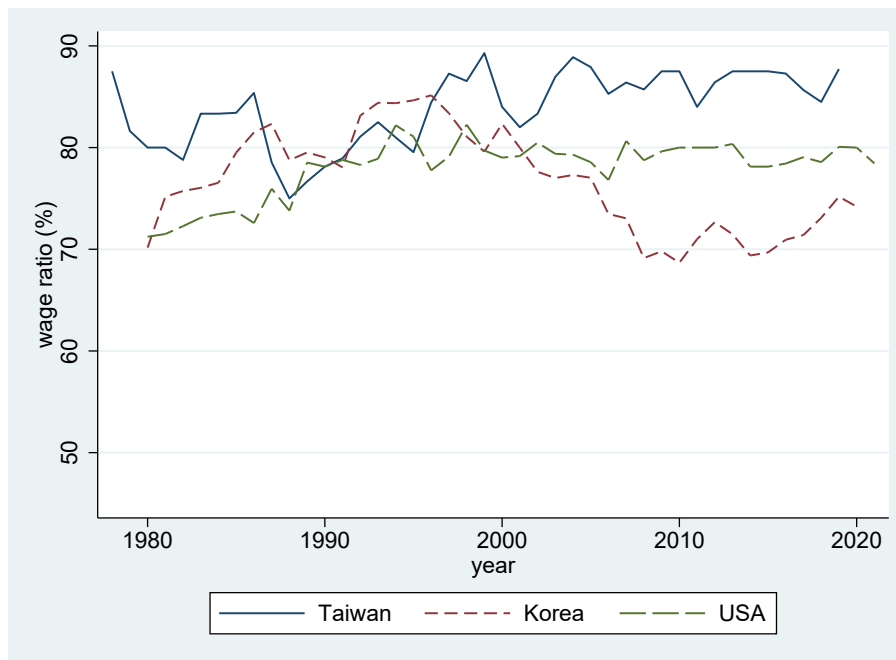
## FIGURES AND TABLES

Figure 1: Gender wage ratio

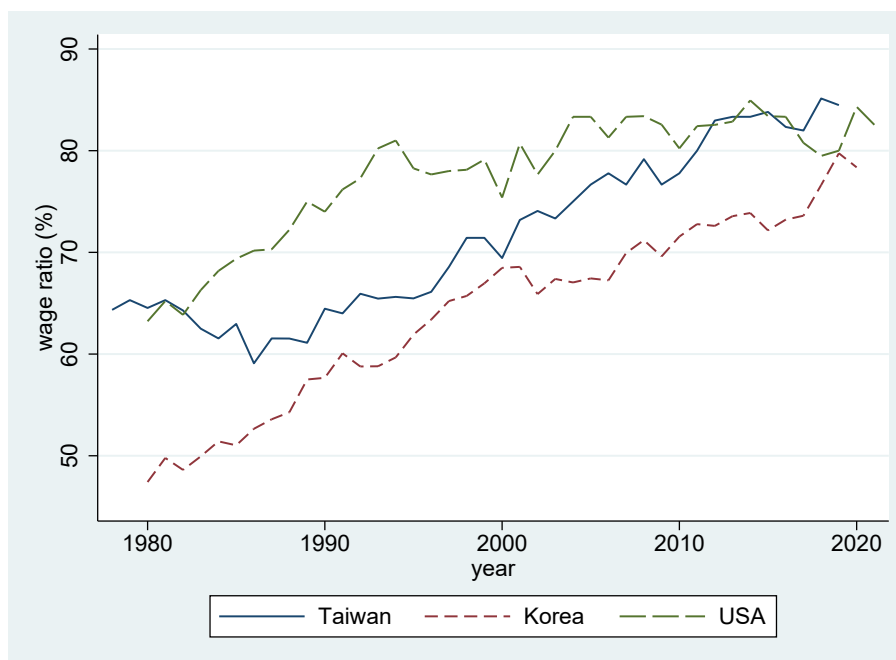


*Note:* Wage ratio is reported in percentage points and defined by the female workers mean wage divided by male workers mean wage.

Figure 2: Gender wage ratio by college degree attainment



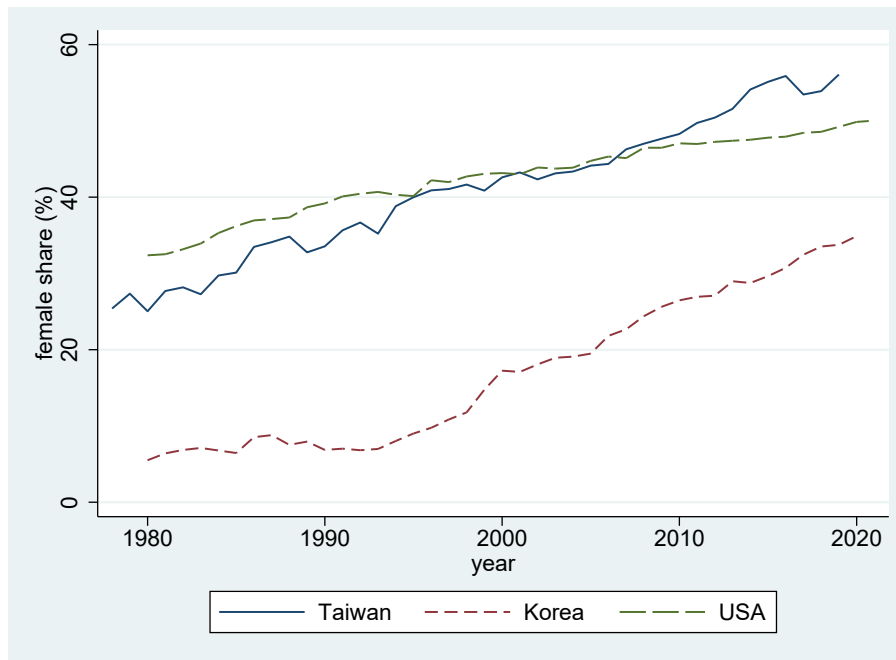
(a) College-graduate workers



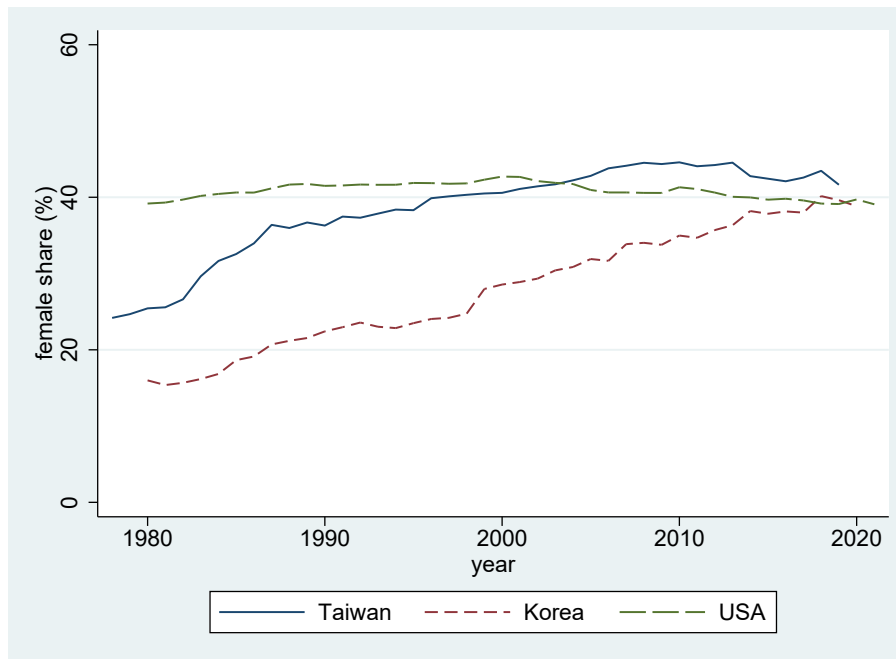
(b) Non-college workers

*Note:* A college-graduate worker is one who has a bachelor's degree or equivalent. Wage ratio is reported in percentage points and defined by the female workers mean wage divided by male workers mean wage.

Figure 3: Female share of workers by college degree attainment



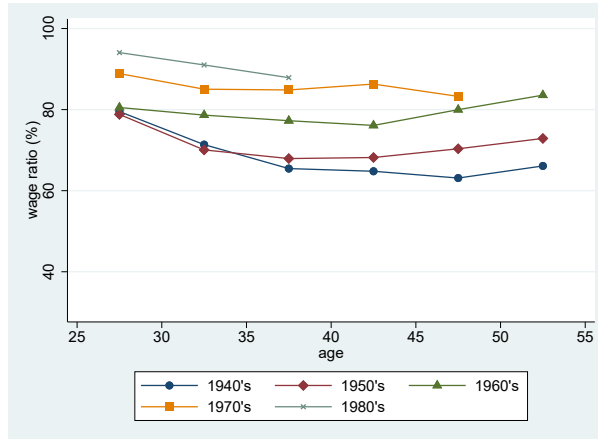
(a) College-graduate workers



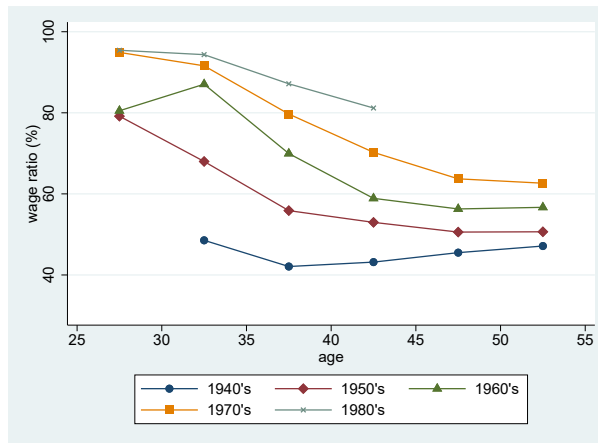
(b) Non-college workers

*Note:* A college-graduate worker is one who has a bachelor's degree or equivalent. Female share of college-graduate workers is reported in percentage points and defined by the number of female college-graduate workers divided by number of all college-graduate workers. Female share of non-college workers is defined respectively.

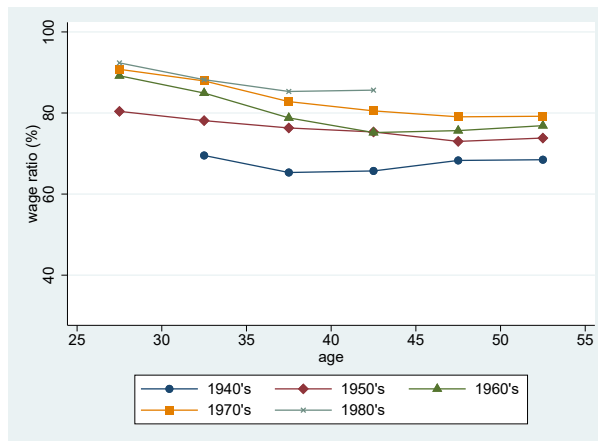
Figure 4: Gender wage ratio by birth cohort



(a) Taiwan



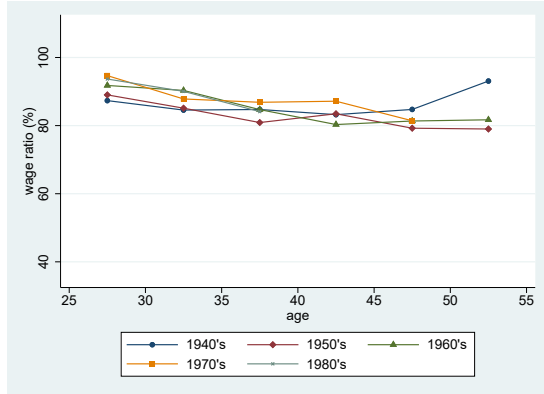
(b) South Korea



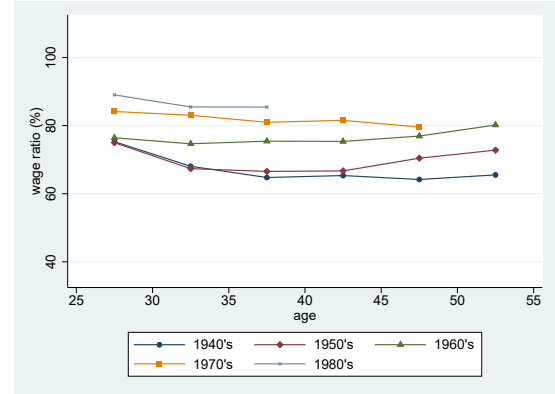
(c) United States

*Note:* Wage ratio is reported in percentage points and defined by the female workers mean wage divided by male workers mean wage. Each point includes workers in an interval of a five-year age and a ten-year birth cohort. 1940's represents the cohort born between 1940-1949, and so as other cohorts.

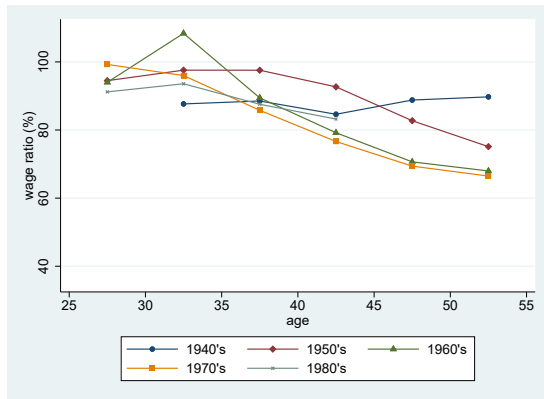
Figure 5: Gender wage ratio by birth cohort and college degree attainment



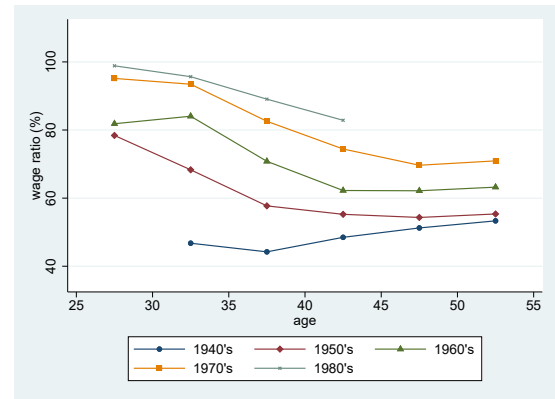
(a) Taiwan, college-graduate



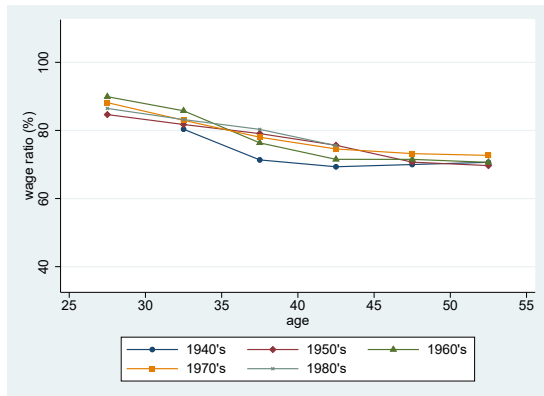
(b) Taiwan, non-college



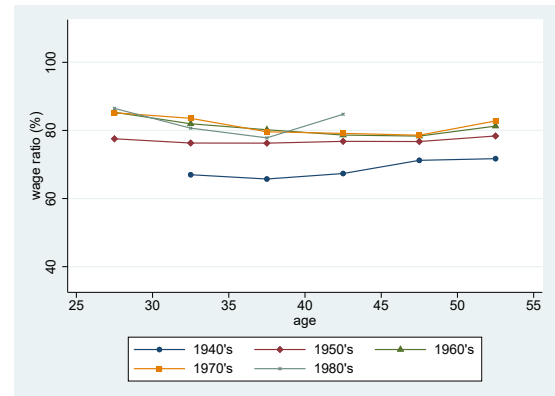
(c) South Korea, college-graduate



(d) South Korea, non-college



(e) United States, college-graduate



(f) United States, non-college

*Note:* Wage ratio is reported in percentage points and defined by the female workers mean wage divided by male workers mean wage. A college-graduate worker is one who has a bachelor's degree or equivalent. Each point includes workers in an interval of a five-year age and a ten-year birth cohort. 1940's represents the cohort born between 1940-1949, and so as other cohorts.

Table 1: Unadjusted Female/Male Hourly Wage Ratio, Full-Time Workers

Year	Sample size		Mean	P(10)	P(50)	P(90)
	Male	Female				
Panel A: Taiwan						
1980	7467	2604	65.58	60.95	66.07	76.92
1990	9440	5257	65.01	59.43	65.22	75.68
2000	10310	6768	73.49	71.11	71.43	83.33
2010	10114	8212	81.93	80.00	81.25	86.21
2019	9273	7676	88.66	90.00	90.00	88.50
Panel B: South Korea						
1980	146447	20452	47.98	53.08	43.19	52.98
1990	259486	64222	57.48	61.22	54.69	58.21
2000	306819	82024	68.84	68.02	67.98	70.96
2010	355559	158299	70.40	78.92	67.22	68.10
2020	366559	197136	78.41	89.64	75.23	75.25
Panel C: United States						
1980	26675	17089	62.62	70.53	62.50	62.32
1990	26481	19385	73.92	78.37	72.00	71.94
2000	23287	18070	76.10	80.00	76.72	74.29
2010	32223	25826	81.74	84.21	82.78	76.53
2020	23333	19412	84.92	85.91	87.18	78.08

*Source:* MUS for Taiwan, SLCET for Korea, and CPS-ASEC for the US.

*Note:* The sample include full-time wage and salary workers ages 25-54. All wage ratios are reported in percentage points.  $P(n)$  represents the  $n$ th percentile of the wage.

Table 2: College Attainment by Gender

Year	Male	Female	Difference: Male-Female
<b>Taiwan</b>			
1980	9.42	9.24	0.18
2000	16.11	17.27	-1.16
2019	35.42	49.53	-14.11
<b>South Korea</b>			
1980	21.41	7.70	13.71
2000	31.39	19.26	12.13
2020	54.30	50.07	4.23
<b>United States</b>			
1980	25.73	20.48	5.25
2000	31.03	31.42	-0.39
2020	40.74	50.93	-10.19

*Source:* MUS for Taiwan, SLCET for Korea, and CPS-ASEC for the US.

*Note:* The sample include full-time wage and salary workers ages 25-54. College attainment is reported in percentage points.