Gender Wage Gap in Korea in Lifecycle Perspective

Selim CHOI

I. Introduction

Korea's gender wage gap has been largest among OECD countries since it first become the member state in 1992. As of 2017, the gender wage gap of full-time workers in Korea has marked 34.6 percentage points and ranked number one, followed by Estonia (28.3) and Japan (24.5) (OECD 2019). Also, as shown in Figure 1, Korea's gender wage gap is among the slowest in convergence and almost unchanging since 2010, even though the gender gap in education attainment has completely closed in mid-2000s.

Korea's astounding level of gender wage gap is due to the interplay of multiple factors, including the factors commonly considered, such as occupational sorting, education gap—both level (for older cohorts) and major choices, career breaks of women during pregnancy and child-raising periods. In addition to these, some unique features of Korean labor market have to do with the country's above-the-average gender wage gap.

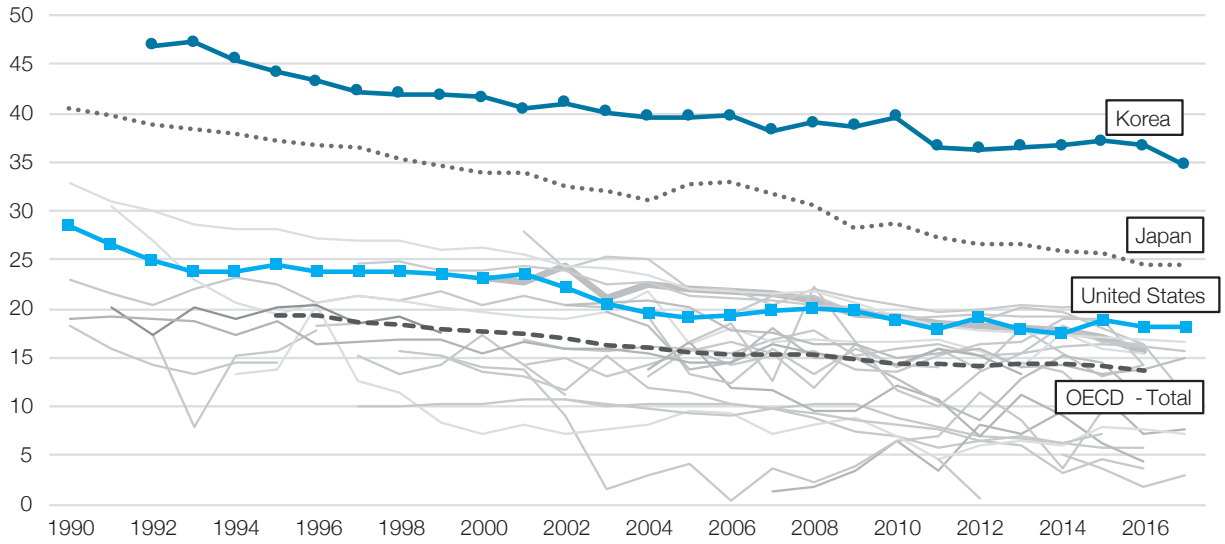
First, Korean employers, both in private and public sector, commonly reward men who served military duty with higher salary by accepting the military service period (now 18 months) as tenure with firm. (Korean firms typically have the tenure-based pay system). For example, based on the government standard pay scale, the two year tenure difference at the time of first entry to government 9th class job induces about 10% gender wage gap. Since the annual raise (to adjust for inflation or growth of the firm) is usually calculated by taking the percentage proportion of previous year's salary, this initial wage gap widens as the tenure with the same employer accumulates.

Another feature of Korea's labor market that contributes to the gender wage gap is the culture of long working hour and the emphasis on the dedication to employer. Since first reporting in 2008, OECD working hour report puts Korea in third place, after Mexico and Costa Rica (OECD 2019). In 2017, Korean workers on average worked 2,024 hours annually, whereas the OECD average is 1,759 hours and Japan, 1,710 hours.

Long working hours can contribute to the gender wage gap if the working hour is above the level that can balance out the work in the labor market and at home (ex. homemaking and childcare). If the working hour is too high, married couple with children will be forced to specialize fully or partially in household work and work in the labor market. In the case of Korea, historically, within-family specialization have been sex-biased in the sense that men most always specializes in work in the labor market and women specializes on the household work. Long work hour above a certain level can enforce this kind of sex-biased within-family specialization to married couples;[1] as a result, it generates the gender gap of on-the-job human capital.

The sex-biased within-family specialization in Korea can contribute to the gender wage gap in the channel

1. Acknowledging this, Korean government has put much effort on reducing working hour and assist married couple's work-life balance. In 2019, the 52 working hour limit per week will be covered in almost all sectors of Korea's labor market and government-backed parental leave policy will be expanded in both length and coverage. This kind of parental leave program and working hour reduction approach had been the government's important initiative in recent years, but gender pay gap hasn't narrowed, not to mention rapidly falling fertility rates.



Source: OECD Gender Wage Gap, 2019.

Figure 1. Trend of gender wage gap (unit: % difference in wage)

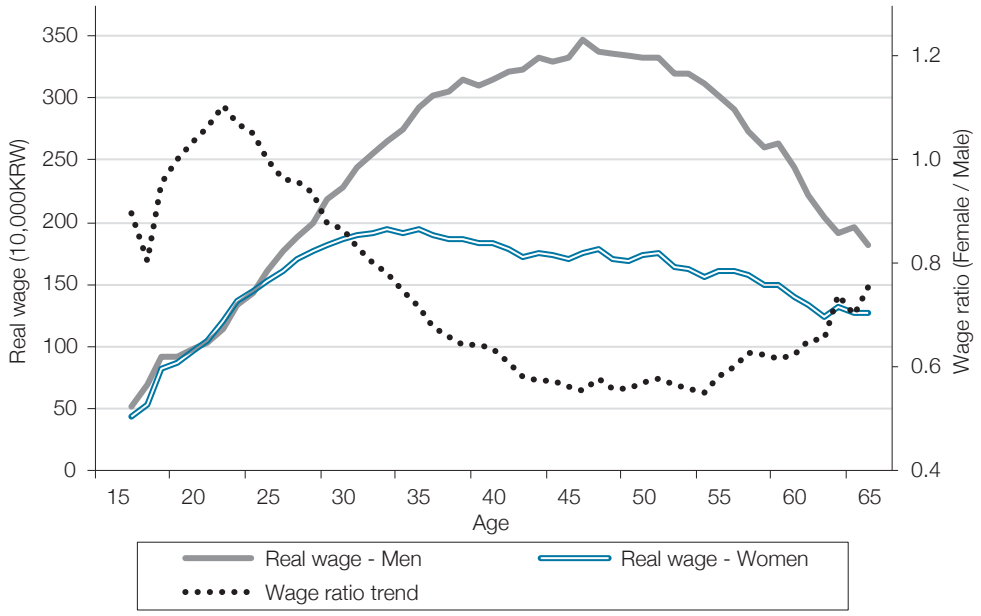
other than through affecting human capital. The sex-biased specialization induces high observable turn-over rate or reduced productivity and work intensity of female workers after marriage and childbirth and this in turn can bias the employer and lead them to discriminate female workers. According to the theory of statistical discrimination (Phelps 1972), if employer has limited information about the job candidate or employees, they use the reference of the group 'statistics' identified by the observable characteristics (ex. sex and race) to evaluate individual workers. That is, firms may discriminate women at the hiring process or promotion because of the high uncertainty about the productivity change or quitting after marriage and childbirth.

In any case, very high gender pay gap that doesn't narrow over time, even with significant increase in female education attainment, can be problematic to Korea. Mainly, it can discourage labor market participation and human capital investment of women. Considering a rapidly declining fertility rates and conservative domestic political atmosphere against immigration, the problem of high gender wage gap will become more serious in the future as it is a key to increasing female labor participation.

In this report, I focus on the lifecycle perspective of the gender wage gap in Korea. In specific, I provide a brief overview of Korea's lifecycle gender wage gap and then discuss evidence of the within-family specialization and its relation to gender wage gap and the labor market discrimination against women. The issue of Korean pay system that rewards military service will not be discussed in this report, as it is generally accepted in Korea as a fair institution to show social gratitude to the military veterans.

II. Pattern of gender wage gap over lifecycle in Korea

It is important to investigate how the gender wage gap evolves over the lifecycle because it may be influenced by the lifecycle events either endogenously (individual's choice about wage in relation to their lifecycle decisions) or exogenously (individuals put in to certain level of pay by outside force). Figure 2 presents the real wage by gender and wage gap in Korea over lifecycle using observations in Korea Labor and Income Panel Study (KLIPS) 1st–20th wave. According to the figure, gender wage ratio (female real wage / male real wage) peaks before mid 20s and then rapidly drops until it reaches the lowest point in mid 40s to 50s. It only slowly recovers after age 55. The growth of wage gap after 25 is attributed to rapid growth of men's wage after 25 as opposed to the slowed growth of women's wage after 25. Then women's wage actually falls after 35. As the drastic changes of wage gap are observed during the age periods when important lifecycle



Source: Korea Labor and Income Panel Study (KLIPS).
Note: The graph is produced by the author using KLIPS 1st–20th observations.

Figure 2. Real wage by gender and gender wage ratio over lifecycle in KLIPS

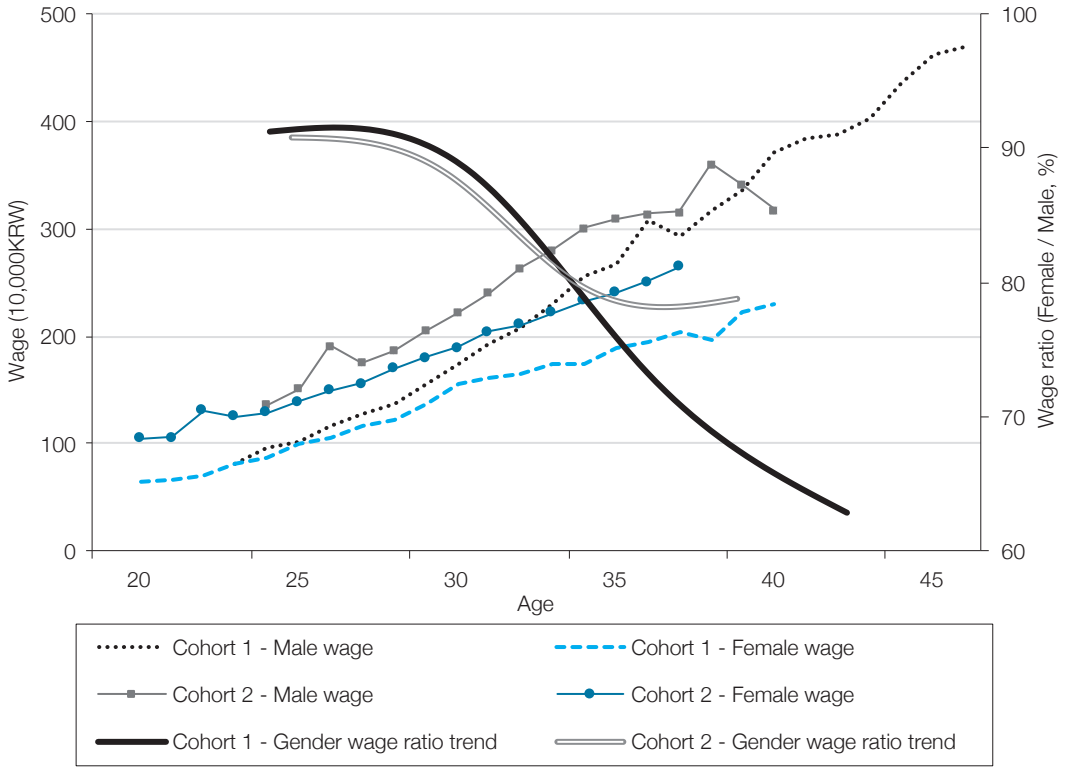
events such as marriage and childbirth occurs most frequently, it is reasonable to suspect that such events have important impact on the gender wage gap.

Choi (2018a) studies this particular aspect by extracting two cohorts from KLIPS and tracing their wages over time. The first cohort is composed of those who completed the final level of education (and don't return to school) within two years of the 1st–3rd (1998–2000) waves of KLIPS (Cohort 1) and the second cohort is extracted in the same way from the 6th–8th (2003–2005) waves of KLIPS (Cohort 2).[2]

The author finds the following stylized patterns about the evolution of gender wage gap over lifecycle in Korea. First, gender wage gap is found from the entry point of the labor market (during age 20s). Even after controlling for the higher starting wage for the military veterans,[3] women on average earn 90% of men's salary. Also, as shown in Figure 3, female-to-male wage ratio starts to fall rapidly from mid-later 20s. This means that gender wage gap in Korea exists and exacerbates even before early 30s where marriage and childbearing occur mostly. Other causes of gender wage gap in the beginning of career may include college major, occupation and industry sorting.

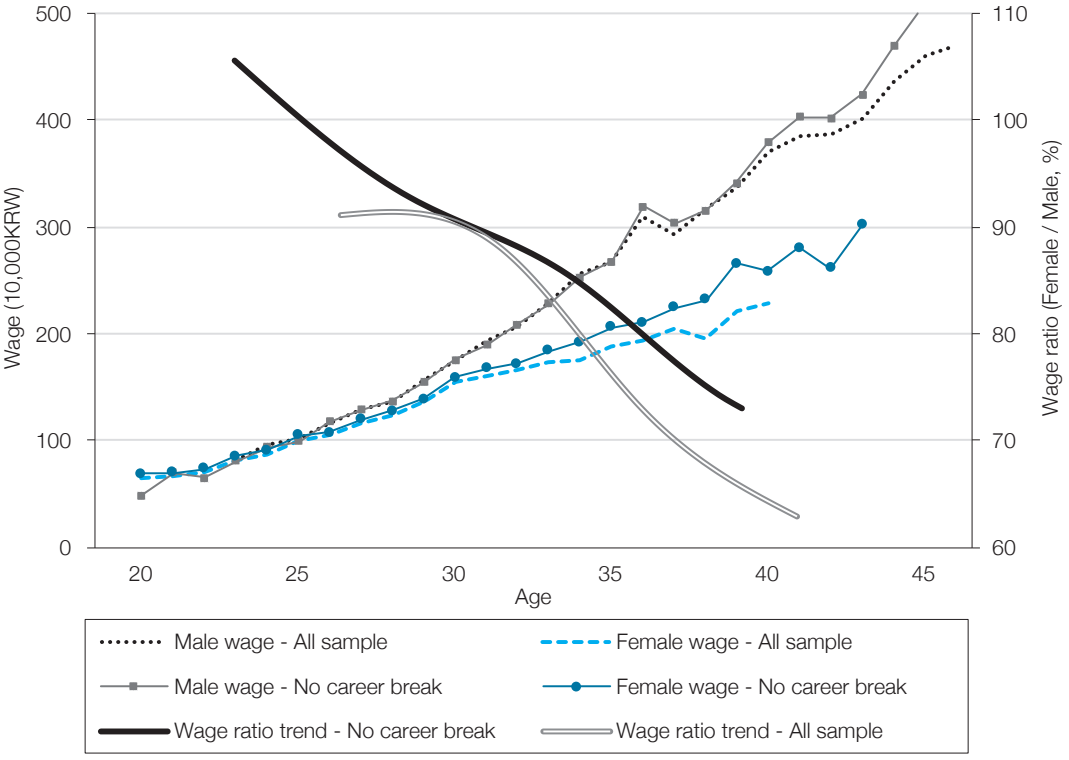
Second, career breaks of women with family care duties don't seem to explain much of gender wage gap in Korea. In KLIPS data, groups with career breaks[4] have slightly lower age-earnings profile for both sexes, but for women, the pattern of gender wage gap is identical in both groups with or without career break. Referring to the Figure 4, regardless of career break experience, the gender wage ratio (ratio of female pay to male pay) peaks at the beginning of career in early-mid 20s and then gradually falls as age increases. Then, the fall

2. The sample includes three education level groups—high school graduates, 2 year college or some college education group, and those with 4 year university diploma or higher degree. In these cohorts, the gender education gap was almost closed (female college enrollment rate has been in par with male's since 2005), but the first cohort enters the labor market during financial crisis and the second cohort in the end of recovery period. Nevertheless, as the analysis required longest possible panel data, this choice was inevitable. Also the two cohorts don't seem to be very different from age groups that are unaffected by the financial crisis.
3. Since men usually serve military duty before finishing their final degree, except for the high school graduates, men's average age at the point of labor market entry is about two years older than women's.
4. In Choi (2018a) analysis, the career breaks are defined by period of not being employed shorter than 2 years. The average career break period of the group without career break was almost close to 0.5 years and there was no significant sex difference.



Source: Choi (2018a).

Figure 3. Wage by sex and gender wage ratio trend of KLIPS data



Source: Choi (2018a).

Figure 4. Wage by sex and gender wage ratio trend by groups with and without career breaks for Cohort 1

accelerates during early and mid 30s, when marriage and childbearing often occurs. In the later cohort (Cohort 2), the same pattern is found except that the drop of gender wage gap slows down at around early 30s and those without career breaks slowly recovers.[5] This implies that the impact of career breaks on women's pay is limited and marriage and childbearing per se may be related with men's rapid pay increase and women's stagnant pay in the early and mid 30s. Indeed, as will be discussed later, even for women who don't experience career breaks, after marriage and childbearing, their working hour falls (probably to accommodate family care duties and household work), while husband increasing the working hour. This, then affects the male-female on-the-job human capital investment gap.

Third, marriage and childbirth affect the lifecycle gender wage gap trend by shifting the gender wage ratio down as shown in Figures 5 and Figure 6. Comparing the impact of marriage and childbirth, childbirth induces a larger shift. However, even before marriage or childbirth occurs, the pattern of falling gender wage gap is found. Also, comparing the groups that gets married and/or have children and that don't, the author finds the same trend of gender wage ratio. Whether women were to get married or not, they commonly experience falling gender wage ratio over lifecycle. They also commonly experience an accelerated fall during early and mid 30s. This implies that marriage and childbirth alone cannot fully explain the falling gender pay ratio over lifecycle. Possible forces behind this common trend may include the within-family specialization for those that gets married and the statistical discrimination against those who have the possibility of getting married or have children (i.e. single or childless women) as briefly mentioned in the introduction.[6]

Lastly, rapidly rising gender wage ratio during the early and mid 30s is attributed to the accelerated men's wage growth and slowed growth of women's wage during 30s. That is, men seem to experience career development during 30s while women's career development seem to slow down in 30s. As discussed earlier, one contributing factor can be the sex-biased within-family specialization which increases men's working hour and reduce women's working hour and hence increase gender human capital gap. In the case of those that don't get married or have children, the wage gap also worsens during 30s. This may have to do with the possibility of the discrimination of employers based on the statistical bias formed by the expectation that women's human capital investment will fall after marriage or due to women adjusting the level of investment by the same expectation about the labor market outcome after marriage.

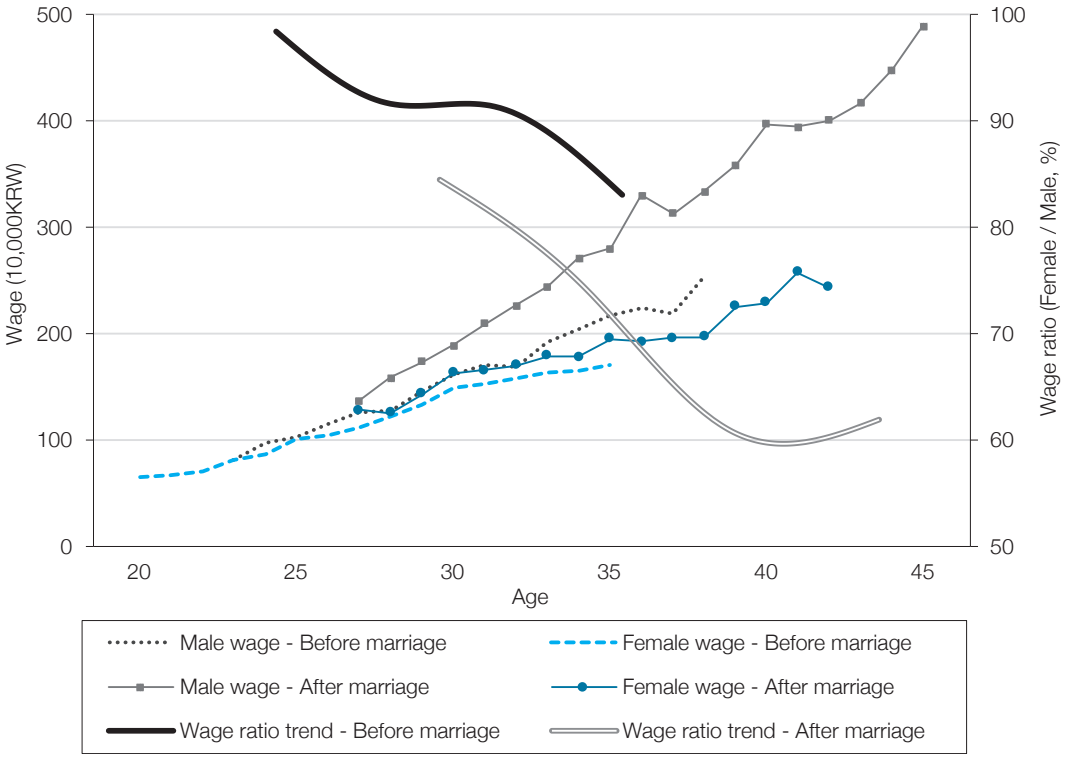
III. Contributors of lifecycle gender wage gap in Korea

1. Long working hour and uneven within-family specialization by sex

Korea's long history of male-dominated labor market and society, where women serving as secondary earner in the family having been the dominating form of family and labor market, may be the force behind women's stagnant career development during their 30s. Combined with long working hour in Korea, marriage and childbirth put couples in a position where at least one person of the couple has to elastically change working hour to accommodate the family care and homemaking duties. With observable gender wage gap over lifecycle, usually it would be optimal for wife to withdraw fully or partly from the labor market in such situation.

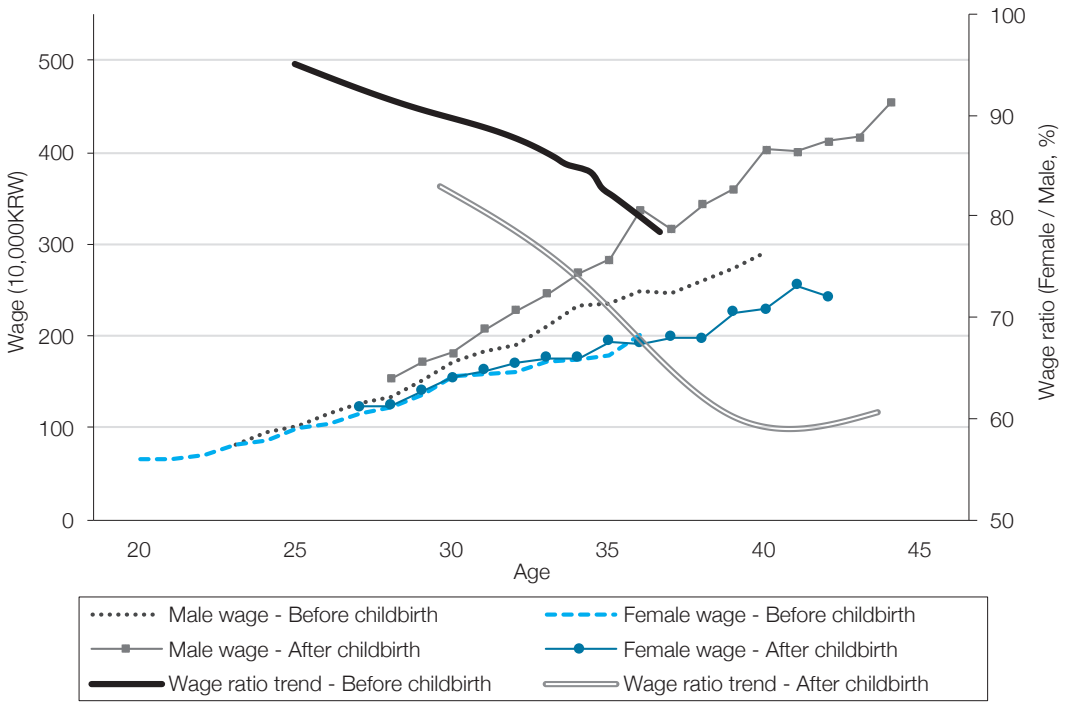
In Bang (2018), this hypothesis has been explored. In specific, the study evaluates the impact of marriage and childbirth on wage by sex. Using 82,609 observations (12,982 individuals) extracted from KLIPS 1st–20th wave, the author first estimates the impact of marriage and childbirth on wage by sex. Using mainly individual fixed effect model, the result shows that marriage increases men's wage by about 9% and decreases women's wage 3–4%. Childbirth is associated with about 2% wage premium of men and 9% wage penalty of women, controlling for the marriage effect. The results are robust to different sets of control variables, including experience, tenure level, working hour, job change experiences, industry and occupation. That is, even within

5. For the figure, contact the author or refer to the "References."
6. This may be a similar pattern as found in the study by Gallen (2018), where the author finds that among single men, single women, married men and women, only unmarried women experience wage discount in Denmark. The cause of this pattern may be diverse, but as will be discussed later, to some extent it may be attributed to labor market discrimination against women.



Source: Choi (2018a).

Figure 5. Wage and gender wage ratio before and after marriage for Cohort 1



Source: Choi (2018a).

Figure 6. Wage and gender wage ratio before and after childbirth

the same industry-occupation and with same level of tenure and experience, marriage and child affect men and women's pay in the opposite direction in Korea. The author also look at the timing of wage change in relation to marriage and childbirth and find that men's wage increase and women's wage decrease starts from 1–2 years prior to the event of marriage and childbirth. This might be the result of individuals adjusting their behavior in the expectation of their career path after marriage and childbirth or firm's adjustment in expectation of worker's behavior after marriage and childbirth.

In the analysis of working hour of full-timers by Choi (2018b), Korean women are working relatively fewer hours than men but the average both exceed 45 hours a week, as summarized in Table 1. The estimation of effect of marriage and childbirth on working hour done by Choi (2018b) shows that having a child increases men's working hour by about 0.8–1 hour per week while it decreases women's working hour by 1–1.2 hour per week. This effect is weak for marriage. By the number and age of children, group of men and women with two or more children and those with child younger than 6 change working hour more drastically than those with one child or older children. The author also conducted the analysis using the sample of married couple where both husband and wife work full-time. When the couples are matched and restricted to dual-earner group, the husband-wife working hour gap is smaller than the full sample. The result show that, even for them, childbirth induce the couple's working hour gap to increase (in the direction of increasing men's working hour and decreasing women's). This serves as an evidence that the marriage and children induces within-family labor market work and household work specialization where women focuses more on in-house work than men.

2. Labor market sex discrimination

Labor market discrimination may be an important factor of gender wage gap in Korea. As discussed earlier, two patterns of lifecycle gender pay gap in Korea leads to such speculation. First is that gender pay gap exists even at the starting points of career and controlling for the special pay rewards for men who served military duty. Second is that women experience the growth of wage gap during 30s regardless of marriage and childbirth experience or career breaks.

As the observable equilibrium of Korean labor market has been such that women reducing work intensity or hour for family duties, if not dropping out completely from the labor market, while men working more intensely during 30s as wife takes care of other duties at home, employers that 'statistically discriminate' women may use this information when evaluating female candidates in recruitment.[7]

Choi (2018c) directly assesses whether there is labor market discrimination against women in Korea at the recruitment stage and provides an evidence that women are being discriminated. Specifically, she studies the 2 year and 4 year college graduates and their early labor market experiences using 2011–2014 GOMS (Graduates Occupational Mobility Survey) data of Korea. The study first evaluates the sex difference in the pre-labor market human capital investment and job preferences. The result shows that in both 2 year college graduate and 4 year college graduate groups, women invested more on the human capital and there was no significant sex difference in job preferences. Both male and female workers prefer jobs that are commonly regarded as 'high quality' jobs—higher pay, stable employment, providing environment for career and individual development, which is different from common speculation that female students will most prefer stable jobs. The only observable difference by sex is the college major distribution; in engineering majors, men are dominant and in social science and humanities major, women are dominant.

The study also looks at the sex difference in job quality within about a year after graduation.[8] Since women

7. Wage discrimination is against the law to pay different salary for the same or same value job. Also, Korean labor laws are very rigid about layoffs and firms cannot flexibly adjust employees; therefore, if statistical discrimination against female worker exists, then it must be strongest at the recruitment process. In the case of sex discrimination in promotion, firms have more information about the individual workers as they have observed the employee while they have worked for firms, so the asymmetry in information is not as serious as at the recruitment stage.
8. By survey design, the job quality questions are asked within at most 1.5 years after graduation.

Table 1. Weekly working hours by sex from KLIPS 1st–20th wave data

Weekly working hour	Female			Male		
	N	Mean	SD	N	Mean	SD
Full sample	28,325	45.46	12.68	45,721	51.34	14.05
Single	9,300	45.54	11.59	0,939	50.77	13.47
Married	19,025	45.42	13.18	34,782	51.52	14.23
Have child	17,314	45.44	13.37	20,791	52.40	14.72

Source: Choi (2018b).
Note: The table is restructured for this report.

invest more than men before labor market and have identical job preference, if there is noticeable gap in the first job quality, then this can imply the presence of the labor market discrimination. The evaluation of GOMS data showed that in all spectrums of job quality (employment type—regular/temporary, employer type, firm size, benefit levels, etc.) men's job were higher quality than women's. Also, wage gap is significant even in this very recent cohort (2011–14 graduates). There is about 20% monthly salary gap and about 11.3% hourly wage gap, and most of the pay gap disappears only after the job quality and employer type variables are controlled for. Pre-labor market investment level and characteristics don't explain the wage gap. This implies that women being placed in relatively inferior jobs and this is a possible reason for women earning less from the starting point of career and their wage growth rate lag behind the men's over lifecycle.

Finally, the author directly tests whether there is sex discrimination at the recruitment of large corporations using GOMS data and Blinder-Oaxaca decomposition method. Specifically, the author decomposed the probability of passing the open-recruitment by large corporations in South Korea of male and female 4 year college graduates who indicated to have prepared for large corporations' open-recruitment. The unobserved heterogeneity such as sex difference in the distribution of ability and career ambition is controlled by restricting the sample to only those who have chosen their career paths in the large corporation.[9] The result showed that even after controlling for the college major, men had higher return (coefficient) to college GPA, TOEIC score (a standardized English test) and the performance in the college entrance exam, a proxy of ability and college ranking. Out of 11.7 percentage points of observable male-female gap of probability of passing a large corporation open recruitment, 17.2 percentage points (147%), is the unexplained gap.[10] Considering that large corporation recruitment are monitored more closely by the government and goes through regular audits, sex discrimination is likely to be more serious in the mid and small sized firms in the private sector.

IV. Summary

To summarize the features of Korea's gender wage gap, first, the gender wage gap changes over lifecycle. Gender wage gap is smallest in the beginning of career (in 20s) and then increases at an accelerated pace during 30s. Other than much studied factors of gender pay gap such as occupation and industry sorting, human capital investment difference, career breaks, working hour, etc., sex-biased within-family specialization—husband focusing on labor market and wife specializing on family caring role—induced by long working hour seem to be the cause of rapidly increasing gender pay gap during 30s in Korea. Specialization within household and the

9. Even so, the unobservable variables may not have been fully controlled; nevertheless, if college students are making rational expectations about labor market discrimination and the type of worker large corporations want, it is actually likely that the female students who chose private sector as opposed to the known discrimination—free public sector, could be the 'high ability' and 'high career ambition' type. So, estimation result could be only the lower bound of the sex discrimination in the recruitment in Korea.
10. Note that the size of unexplained gap is larger than the raw difference because in all aspects, average observable human capital investment level was higher for female applicants.

resultant gender working hour gap during 30s affect the gender wage gap by inducing gender gap in on-the-job human capital accumulation.

Probably related with this pattern, firms may be systematically discriminating against female workers in Korea. Based on the GOMS data analysis by Choi (2018c) in the recruitment, female candidates are judged by higher standard than male candidates and have lower chances of passing. According to the statistical discrimination theory, if a firm observes that female workers tend to have a higher turnover rate or reduce work intensity after marriage or childbirth, then they may use such statistical observation to evaluate the workers at the recruitment process. Hence, the sex-biased within-family specialization after marriage and childbirth can reinforce the existing statistical discrimination against women and sustain gender wage gap by updating the employer's bias about the female workers. The existence of labor market sex discrimination and high observable gender wage gap over lifecycle can also promote such uneven within-family specialization. After all, expected lifetime income of husband and wife should be one of the most important considerations in the couple's specialization decision.

In any case, high gender pay gap is expected to become more important social issue in Korea. Korea is already expecting the downsizing of population in very close future with a very low fertility rate. To maintain the economic competitiveness and sustain the society, increasing female labor participation will become a more important policy agenda. However, a sustained high gender pay gap serious undermines women's human capital investment motivation and labor participation. Korean government has been passive in taking policy actions about the gender pay gap, but maybe it is about time to take more action and adopt effective policies.

References

Bang, Hyungjoon. 2018. "The Effect of Marriage and Childbirth on Wage by Sex," in *Lifecycle Gender Wage Gap: Focusing on the Effect of Marriage and Childbirth*. Seoul: Korea Labor Institute (in Korean).

Choi, Selim. 2018a. "Labor Market Gender Wage Gap and Lifecycle," in *Lifecycle Gender Wage Gap: Focusing on the Effect of Marriage and Childbirth*. Seoul: Korea Labor Institute (in Korean).

———. 2018b. "The Effect of Marriage and Childbirth on Working Hour by Sex," in *Lifecycle Gender Wage Gap: Focusing on the Effect of Marriage and Childbirth*. Seoul: Korea Labor Institute (in Korean).

———. 2018c. "The Gender Difference and Discrimination in the First Job Transition after College," in *A Study for Facilitating First Labor Market Transitions of Youth*. Seoul: Korea Labor Institute (in Korean).

Gallen, Yana. 2018. "Motherhood and the Gender Productivity Gap." *Working Paper No. 2018-41*, Becker Friedman Institute for Economics, University of Chicago.

OECD. 2019. *Gender wage gap (indicator)*. doi: 10.1787/7cee77aa-en (accessed 21 January 2019)

———. 2019. *Hours worked (indicator)*. doi: 10.1787/47be1c78-en (accessed 02 February 2019)

Phelps, E. S. 1972. "The Statistical Theory of Racism and Sexism." *American Economic Review* 62(4): 659–661.

AUTHOR

Selim CHOI

Associate Research Fellow, Employment Policy Research Division, Korea Labor Institute (KLI).