GENDER WAGE GAP: THE COMPARATIVE ANALYSIS BETWEEN KOREA AND VIETNAM[1]

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Abstract

This paper employs Juhn, Murphy, Pierce (JMP) decomposition using two nationally-representative data in Korea and Vietnam in two different years to examine the country-specific change in wage gap and inter-country difference in wage gap. Conclusions are (i)wage gap is much higher in Korea than it is in Vietnam substantially being due to greater gender disadvantage of female workers in Korea, (ii) wage structure difference explains little to inter- country wage gap differential, (iii) sign of discrimination resulting in wage inequality is captured at upper part of wage distribution in Korea (glass ceiling effect) but at the lower points of wage structure in Vietnam (sticky floor effect), (iv) wage gaps increase in both countries by small amounts between 2004 and 2006, (v) education change contribute positively to the decrease of wage gap, but largely are offset by deterioration in gender discrimination that keeps the wage gap expanding in both countries, and (vi) occupation/industry gender segregation and wage compressing plays the same role in affecting the change wage gap in two countries, the former increases the gap where as the later reduces the gap

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1. Introduction

The diversified patterns of the expansion or contraction of wage gap have been captured in many country-specific researches in countries around the world. Although the common findings have been discovered relating to the improvement of education and its role, there are actually large differences in the findings relating to which other major factors stands behind the trend, namely discrimination. Beside, difference in level of development of economy or structure of labor market seems to be the sources of concern.

Vietnam and Korea are pretty much different in terms of level of development and labor market as well as wage inequality. But whether the fact that wage gap in Korea being pretty higher than Vietnam for most of the time in the past, given more favorable labor market condition and high qualification for women, is directly linked with the gap in development and difference in labor market characteristics between two countries remains to be an open question

About the change in wage gap in either Vietnam or Korea, it does not explain much to the difference between countries by seeing how comparatively those changes are, but to understand which factors contribute ultimately for those changes and whether those factors reflect the differences between labor market in Korea and Vietnam are more of the concern in a comparative research

This paper is therefore looking at wage gap in two different countries to not only to understand the wage gap trend of each country but also explore how various factor may have differentiated impact on the wage gap changes. Along with the between-country comparison in the trend of contribution of factors in wage gap changes, this paper also attempts to explain the wage gap difference between Korea and Vietnam to see how much that difference is due to difference in labor market characteristics and how much it is attributable to the difference in female comparative disadvantage.

The paper is structured as follows: First section will review the literature of wage gap and the methodology for analyzing the wage gap. Second section will discuss about the data used in both countries. Third section will mainly be preserved for the estimation of wage equation. Fourth section will describe the wage inequality trends in both countries. Subsequent section will be dedicated entirely for decomposition analysis. Sixth section concludes.

2. Literature review

Empirical studies of labor market discrimination have long tradition in terms of new methods, application to numerous groups and countries and their testing of labor market theories. One of the features of the mainstream studies is the use of straightforward regression analysis to examine the difference across groups where coefficients attached to those groups are interpreted as evidence of discrimination

Regression analysis underlies another widely used method to estimate the extent of wage discrimination developed by Blinder and Oaxaca, the wage gap decomposition. This method explains the wage gap by dividing it into two terms, one explains the difference in characteristics and another one points to gender discrimination. This single year decomposition has been enormously used to examine the difference in gender discrimination effect in many countries.

Researchers have subsequently introduced a number of extensions that either employ wide variety of regression strategies (Mincer and Polachek, 1978; Dolton and Make-peace, 1986; Wright & Ermisch, 1991) or build more steps into the decomposition (Juhn, Murphy and Pierce, 1991; Brown, Moon and Zoloth, 1980) in order to provide richer results in one specific year. More over, extended versions of decomposition being presented which includes the time and country dimension allows researchers not only to measure changes overtime but also the difference in labor market characteristics which eventually leads to changes/differences in wage gap.

JMP decomposition is currently applied widely in wage gap research. This methodology is developed based on the rising need of justifying the level of gender discrimination that explains the wage gap. By dividing the unexplained part into two different components, the method claims it might not be the discrimination itself only that causes the wage gap, it argues that the male residual wage inequality might possibly be the source of concerns.

Many country-specific researches have been carried out having methodology centered around the application of JMP decomposition. Most of the questions raised are how the improvement in education which happens in many countries benefits female workers and consequently reduce the wage gap overtime, and how discrimination is going to offset this education achievement. Country-specific wage structure change overtime is also taken into consideration. However, different time span in which the gap witnesses the significant change, and the different wage determination mechanism (reflected through different specifications of wage equations) make it hard to generalize the results

Due to the large variation of wage gap in countries around the world (Blau and Kahn, 2002 and 2004) , it is possible that there is much to learn by exploring the gender wage differences comparatively across countries. Besides meta-analysis which uses the secondary data (Blau and Kahn, 2003; Weichselbaumer and Winter-Ebmer, 2002), JMP decomposition with country dimension is also adopted(Blau and Kahn in a series of papers). The results could be summarized that gender wage gap tends to be higher in countries with larger overall wage inequality because generally female workers are more likely to be located in the bottom of wage distribution.

In Vietnam, to date, most of papers have been discussing the wage gap in one specific year. It seems they are all coming up with the findings that discrimination is the important factor leading to wage gap. In terms of analysis of wage gap change overtime, the most prominent paper is conducted by Amy, Liu (2004) in which she used the previous rounds of Vietnam Living Standard Survey in 1992 and 1998 to examine the wage trend in Vietnam. She found that the narrowing of wage gap happening in this period is hindered by the rise in gender discrimination against female workers.

In Korea, although large volumes of researches about gender wage gap have been presented, not many have been focusing on change in wage gap. The most current paper by Kim Juyoung (2008) is one of the first attempts on this issue. He used the Korea Labor and Income Panel Study (KLIPS) to explore the wage gap change in Korea and tried to explain how much the change in education helps female workers get better position in the labor market. The findings are suggesting the role of education but most of the gap is still tied to discrimination.

3. Data used

For Korea, we employ Economically Active Population (EAP) survey data. This data contain information on the economic status of the population and changes in activity patterns of the labor force. Questions have been added to the original survey since 1999 for a detailed analysis such as discouraged workers or unemployed person by period of looking for work. Supplement survey on varied forms of working including day-time worker and part-time workers also have been implemented since 2001. . The sample of the supplementary survey was changed survey several times to reflect the rapid fluctuation of socio-economic situation. The sample size of the whole survey is around 33000 households in which 70000 individuals are selected for the supplementary survey.

In Vietnam, we intensively utilize the Vietnam Households Living Standard Survey (VHLSS) which has been conducted every two years since 2002. This survey covers

general indicators reflecting the current living standard of households' members such as education level, income and expenditure. The survey also contains valuable information about employment status, demographic indicators and the participation in hunger eradication and poverty reduction program of households' member. There are about 75000 household in the survey sample of which only 30,000 household were actually interviewed to collect the information on both income and expenditure.

We take the data in 2004 and 2006 for analysis. This is basically due to the availability data in Vietnam. The most current survey is in 2008 but the data have not been made accessible yet whereas the data in 2002 is not reliable enough.

For both countries, information on individual wage is collected on the monthly basic with the number of hours worked. While in Vietnam, the question on total wage is asked for the previous 12 months, the question in EAP data asks for wage in the last 3 months. However, there is detailed information on the number of hours worked which is equivalent to the income derived. So to arrive at hourly wage, we simply divide the total wage received by the corresponding number of hours worked. In order to eliminate the measurement errors in wage, we exclude the population below 1% and above 99% of the wage distribution. For the comparability of wage, we adopt consumer price indices and the exchange rates in two years of 2004 and 2006 to compute the real wage in 2004 Vietnamese Dong values.

Information on education is also available in both surveys. It should be noted that the education attainment level and the standard number of schooling years required to complete certain level of education are the same in each countries. It is therefore allowing us to convert the level of education into comparable number of years of schooling between countries.

One of the problems in the construction of data is the occupation and industry codes. Each country has different coding system for occupation and industry. But fortunately, for industry code, both countries follow the International Standard Industry Classification (ISIC). So for the conversion, we rely on the ISIC code to make the two systems comparable. Furthermore, in our analysis, we keep the industry classification at a aggregated level which includes only 5 categories. For occupation, we use aggregated 1-digit occupation code which is similar in two countries.

We, therefore, include only occupation and industry for the sector analysis. One of the important dummy in Vietnam that explains the wage is the ownership type of company is working for. Such variable is available in Vietnamese survey but unfortunately it is not available from EAP data.

We also apply some other filtering criteria to screen the data and drop observations that are either causing either measurement errors or not group of interest, such as the exclusion of army, child labor, ect..

The final samples used include 6469 and 6950 individuals in Vietnam in 2004 and 2006. The corresponding sample sizes in Korea are 25321 and 24711

4. Estimation of Wage equation

We start our analysis by estimating the standard equation developed by Mincer in 1974 which models wage as the function of human capital such as schooling and experience. The dependent variable is therefore log of hourly wage. Other dummies which are either highly likely to be significant or intuitive for the analysis of comparable wage gap study are also included in the model as explanatory variables. The basic model is, thus, as follows:

$$y_i = \varphi(s_i, x_{i,} z_i) + u_i \qquad (1)$$

where y_i is the logged (hourly) labor market wages for individual i; s_i stands for completed years of schooling, x_i is a matrix of personal characteristics other than schooling, namely, experience, experience squared, gender, and z_i is a matrix of context-specific circumstances, namely industry or occupation. The last component, u_i, is a random disturbance term that captures unobserved characteristics.

It should be noted that the model is specified in a way that we include the squared term of years of schooling to capture the non-linear relationship between schooling and wage. It could be argued that the rate of return may not only necessarily different at each level of education (which the model with dummies of education level would allow to capture) but also varies across number of years of schooling. Intuitively, it means that, return to one addition year of schooling of individual who has already completed any years of schooling would be different regardless of whether he/she completed certain level of education yet or not. Empirical evidences often suggest that there exists the nonlinear relationship between years of schooling and earnings. Moreover, it even happens the case in which, at a very low level of schooling, rate of return is even negative which means that individual investing in education not only does not bring about the increase in wage, but also results in deceasing the level of earnings

Experience is constructed to reflect potential experience that individual has. It means that regardless of whether one either works for more than one companies or stop working for a certain period, every year after his/her education is counted as experience. This could be problematic for the estimation as some middle-age women might quit the job for child caring which is probably pretty popular in Korea. This therefore might lead

to the over-estimation of experience in of female workers. This should be taken into consideration in the interpretation of regression results.

Although we are not really much into the interpretation of these schooling variables, the causal sense of the relationship should be addressed here as some of the individual ability that might affect both the level of education and the participation in labor market afterward are not measured and inserted into the equation. Additionally, there may be selectivity bias generated by the fact the many adults are actually wage earners. However, recent review by Card (2001) which is focusing on the causality between schooling and wage found that other factors relating to ability do not exceed 10 percent of the schooling coefficient, and the use of instrumental variable whose construction based on family background often brings about the returns higher than classic OSL estimates by a very small amount, Psacharopoulos and Patrinos (2002). Therefore, subsequent decomposition analysis which uses the coefficients of schooling tends to offer the quite similar results whether one prefers one regression methodology over the other. However, arguably, if there is the discrimination right in the provision of education, then we simply miss it.

As mentioned above, couples of dummies of industry and occupation are also put into the equation. This necessity comes from the fact that wage varies a lot across industries and occupation. Moreover, this is supposed to control for the association of gender wage gap with the location of employment as well. Furthermore, as the analysis of wage gap undertaken later is chronological, this inclusion may somehow reflect the shift in supply and demand and allow us to capture this movement in explaining the wage gap from the accounting sense. However, these dummies entering the equation may bring about the worry that there could be potential endogeneity as they themselves are relatively affected by different wage levels across industries and occupations. Furthermore, they are also potentially correlated with the errors terms caused by the fact that access to certain occupation or industry is subject to discrimination, especially when gender factor is also controlled for. We will discuss this issue at length later in the decomposition analysis.

It could be argued that this specification is not to reflect the wage determination in, for example, in Korea. But as we are eventually trying to compare the evidence across countries, if we include one more variable, even if that variable is strong indicator, in one country, without having it in the model for another country then it is pointless for comparability of results. More specifically, it does improve preciseness of the regression or the decomposition later for each countries but the interpretation of the coefficient attached to that variable has no value in sense of comparison between countries. In other words, if we capture the gender difference of that factor in one country then in order to

compare we have to assume that there is no gender difference in that kind of factor, which is the big assumption given that the difference unmeasured doesnt mean it is non-existent.

Gender wage gap is captured by the coefficient attached to gender dummy. By employing various specifications with additional explanatory variable being adopted gradually, not only could robustness of the results be tested, but also gender wage gap be quantitatively assessed after controlling for various other factors that come into play in the determination of wage.

Relating to the regression strategy, we are presenting here the pooled regression meaning that we group all workers regardless of what gender they are. It should be noted that, for the decomposition analysis of wage gap later on, the gender-specific differentiated impact of various factors on wage must be taken into consideration which means that regressions for male and female workers are to be done separately, but with these exact explanatory variables. This pooled strategy is simply supposed to tell us about the wage determination in the labor market as a whole of each country in specific year and the wage gap after controlling for various country-specific characteristics of the labor market

The results of regression are presented in table 01 and 02. The exercise is undertaken for each country at different point of time. There are four models for each country in each year with the first basic model including only human capital variables, and the next ones include further dummies for gender, industry and occupation. It could be seen from the tables that (i) schooling actually has non-linear relationship with wage in both Korea and Vietnam in both years, (ii) though level of education is higher in Korea, rate of return to education, calculated on averaged year of schooling, is pretty much the same between two countries, which is around 5%, and (iii) potential experience is also significantly contributing to the wage determination. Also coming from the table, gender wage differential is much higher in Korea but it, for both countries, though increases, seems to stay stable over the periods under observation. While it is consistent with current analysis in Korea, which also found that wage gap in Korea is pretty high and not much change has been detected (Juyoung, K., 2008), it is offering an opposite evidence about wage gap in Vietnam that wage inequality is rising. Analysis based on previous rounds of VHLSS data discovered the contraction of wage gap from 30 percent in 1992 to almost 14 percent in 2002 (Liu, A., 2004; Hung, P. and Barry, R., 2007).

Some other findings from the regression tell us that wage in agriculture sector is lowest for both countries in both year and the occupation wage gap seems to be different between countries. Whereas the leaders/top level professionals enjoy the highest level of

compensation in Korea, their counterparts in Vietnam seems not to be in superior position as their wages are not among the highest. It comes from the fact that in Vietnam, wages in public sector (where large proportion of leaders/ top level professionals is working) are not necessarily at the top level comparing to those at lower level in private or foreign invested sector[2]

As mentioned above, gender wage gap did not experience the dramatic change during the period under consideration. The results indicate that, controlling for the human capital variables, including experience and schooling and their squared terms, in Korea, male workers on average earns 34% higher than female workers in 2004 and this gap remains almost unchanged in 2006. During the same period of time, gender wage gap in Vietnam observes the small amount of increase from 13 percent to nearly 16 percent in favor of male workers. Gender wage gap tends to increase after controlling for occupation and industry dummies, especially in Vietnam but again the rise is not much

Table 01 : Regression results of Wage equation for Vietnam using VHLSS data (pooled sample)

Independent variables: Logarithm of hourly wage	Human capital		Gender		Industry		Occupation	
	2004	2006	2004	2006	2004	2006	2004	2006
Year of schooling	-0.022***	-0.017***	-0.027***	-0.023***	-0.029***	-0.024***	-0.020***	-0.012**
	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]	[0.005]
Year of schooling squared	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***	0.003***	0.003***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Year of experience	0.031***	0.032***	0.030***	0.030***	0.030***	0.030***	0.029***	0.030***
	[0.002]	[0.001]	[0.002]	[0.001]	[0.002]	[0.001]	[0.002]	[0.001]
Year of experience squared	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Gender			0.132***	0.159***	0.130***	0.157***	0.153***	0.162***
			[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]
Mining and quarrying					0.193***	0.215***	0.185***	0.208***
					[0.045]	[0.046]	[0.045]	[0.045]
Manufacturing					0.014	0.017	0.006	-0.003
					[0.019]	[0.019]	[0.020]	[0.021]
Service					0.005	0.009	-0.018	-0.008
					[0.020]	[0.018]	[0.022]	[0.019]
Top level Professionals							0.464***	0.477***
							[0.039]	[0.036]
Middle level Professionals							0.435***	0.373***
							[0.034]	[0.031]
Staff, white collar							0.320***	0.225***
							[0.039]	[0.039]
Skilled worker in service							0.109***	-0.03

[2] Vietnam Development Report, Business, 2006

							[0.042]	[0.039]
Skilled worker in agriculture and aquaculture							0.350***	0.343***
							[0.062]	[0.056]
Skilled handicraftmen							0.207***	0.164***
							[0.035]	[0.031]
Assembler and machine operator							0.406***	0.386***
							[0.039]	[0.037]
Unskilled worker excluding army							0.162***	0.067**
							[0.034]	[0.030]
Observations	6350	6755	6350	6755	6350	6755	6350	6755
R-squared	0.22	0.26	0.24	0.28	0.24	0.28	0.27	0.33

Standard errors in brackets

** significant at 10%; ** significant at 5%; *** significant at 1%*

Table 02 Regression results of Wage equation for Korea using EAP data (pooled sample)

Independent variables: Logarithm of hourly wage	Human capital		Gender		Industry		Occupation	
	2004	2006	2004	2006	2004	2006	2004	2006
Year of schooling	0.023***	0.024***	0.001	-0.002	0	0	-0.020***	-0.020***
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
Year of schooling squared	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.002***	0.002***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Year of experience	0.038***	0.030***	0.033***	0.026***	0.033***	0.026***	0.036***	0.030***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Year of experience squared	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.000***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Gender			0.329***	0.346***	0.321***	0.333***	0.331***	0.343***
			[0.007]	[0.007]	[0.007]	[0.007]	[0.007]	[0.007]
Mining and quarrying					0.391***	0.144	0.295***	0.018
					[0.093]	[0.128]	[0.087]	[0.117]
Manufacturing					0.181***	0.006	0.113***	-0.048*
					[0.028]	[0.026]	[0.030]	[0.026]
Service					0.112***	-0.107***	0.041	-0.155***
					[0.027]	[0.026]	[0.030]	[0.026]
Top level Professionals							-0.132***	-0.188***
							[0.025]	[0.024]
Middle level Professionals							-0.186***	-0.239***
							[0.025]	[0.024]
Staff, white collar							-0.659***	-0.719***
							[0.026]	[0.025]
Skilled worker in service							-0.534***	-0.595***
							[0.027]	[0.026]
Skilled worker in							-0.702***	-0.925***

agriculture and aquaculture							[0.051]	[0.053]
Skilled handicarftmen							-0.546***	-0.624***
							[0.026]	[0.025]
Assembler and machine operator							-0.508***	-0.576***
							[0.026]	[0.025]
Unskilled worker excluding army							-0.811***	-0.861***
							[0.026]	[0.025]
Observations	24830	24310	24830	24310	24830	24310	24830	24180
R-squared	0.29	0.28	0.35	0.35	0.35	0.36	0.46	0.46

Standard errors in brackets

** significant at 10%; ** significant at 5%; *** significant at 1%*

5. Wage inequality trend, the case of two countries

Table below gives the statistics about the wage inequality trends in both countries. For each group of workers, it is presented here the wage ratio between wage percentiles. It means that 90-50 differential is the wage ratio between 90 and 50 percentile. By this analysis, with the assumption that workers at upper deciles may reflect the level of skills, not only can we look at the difference between skilled and unskilled workers, but also their relative wage positions in the gender wage distribution can be examined.

It could be observed that for both male and female workers, upper deciles are far above the lower deciles in terms of enjoying the level of compensation. Taking Vietnam as an example, the wage ratio between 90 and 10 percentile in 2004 is about 3.6 and 4.5 for male and female workers respectively. This would imply that the average wage of skilled workers (represented by upper deciles) is almost 4 times higher than that of unskilled workers (represented by lower deciles).

Looking closer at the 90-10 differential, female workers' relative position at the bottom of the wage distribution (10 percentile) is worse than male workers in Vietnam and it is not getting better overtime. The 90-10 wage ratio for female workers in 2004 is 4.5, compared to 3.6 for male workers and it is increasing slightly in 2006 to arrive at 4.8 and 3.7 for female and male workers, respectively. Simple comparison using the same wage ratio reveals the opposite evidence in Korea, that, female workers are actually facing less within group inequality as compared to male counterparts

Change in wage differential also tells us the relative shift/move-along of the wage distribution overtime. Positive (negative) change indicates the expansion (contraction) of the wage gap overtime. As can be seen from the table, female workers in Korea tend to experience the widening wage gap as the wage ratio is increasing between 2004 and 2006.

During the same period in Korea, relative position of male workers is fairly stable. Similarly, gap seems to be widening in Vietnam and the magnitude of the expansion is higher as observed among female workers

The higher the level of wage, higher the wage within-group inequality, no matter what group of workers or which country is observed. It is demonstrated by the 90-50 percentile differential always being higher than the 50-10 percentile. It could be explained in Vietnam that minimum wage, which is supposed to have direct impact on the low skill low paid workers, has been raised about 20% annually. Given the percentage of unskilled workers is as large as 75 percent of the labor force and remarkable portion of these workers have been actually paid at minimum level, clearly, this minimum wage hike will raise their pay level and help make the wage distribution more compressed to the left. In Korea, as most of workers are relatively high skilled, interestingly, the pattern holds. This is probably because the lower percentile does not necessarily represent low skilled workers in Korea. Moreover, not only inequality is less in lower percentile, female also enjoy the less inequality for this specific low percentile over time. The 50-10 female differential decreases from 1.7 in 2004 to 1.6 in 2006.

Table 03: Wage inequality trend in Vietnam and Korea in the period of 2004 and 2006

	Vietnam		Korea	
	2004	2006	2004	2006
Male				
Standard deviation of log wage	0.511	0.526	0.589	0.602
90-50 differential of hourly wage	2.082	2.083	2.250	2.200
50-10 differential	1.732	1.799	2.200	2.250
90-10 differential	**3.605**	**3.747**	**4.950**	**4.950**
Female				
Standard deviation of log wage	0.587	0.595	0.548	0.551
90-50 differential of hourly wage	2.397	2.404	2.365	2.400
50-10 differential	1.909	2.019	**1.706**	**1.667**
90-10 differential	**4.577**	**4.853**	**4.000**	**4.035**
Gender log inequality	0.118	0.146	0.461	0.462
Mean Female percentile in male wage distribution	0.436	0.421	0.281	0.284

Note: This table contains waged workers aged 15-60 from EAP data in Korea and VHLSS data in Vietnam. Years of observation are 2004 and 2006 for both countries

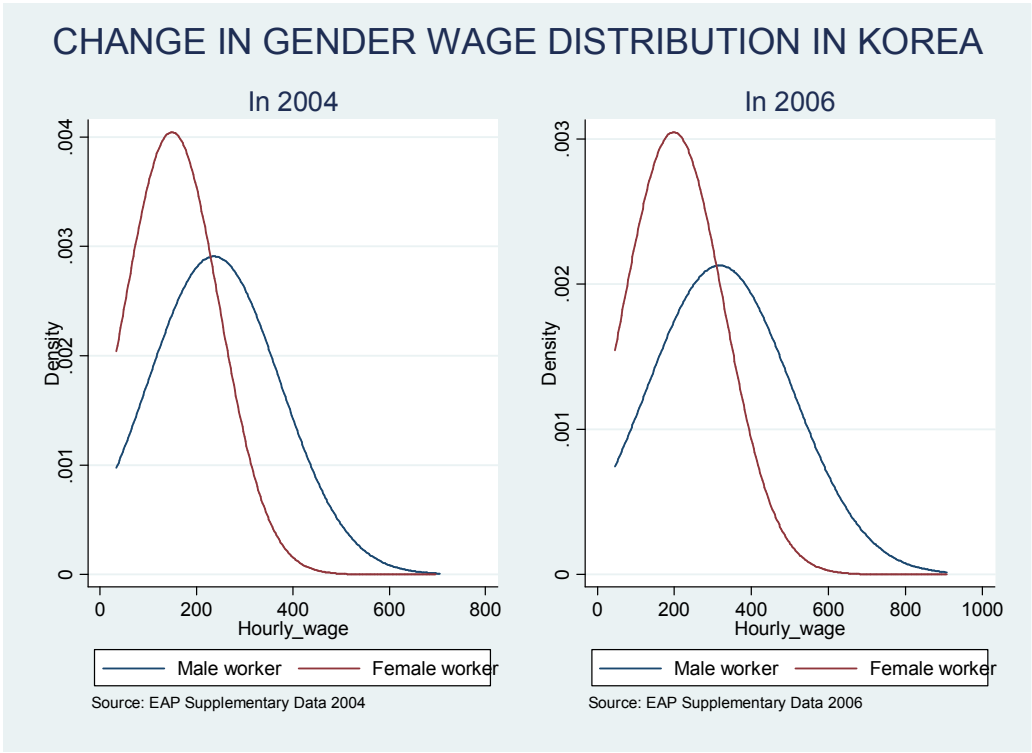
Wage is measured on hourly basic by dividing last 12 month wage by the number of hours worked for the case of Vietnam and by dividing last 3 month wage by equivalent number of hours worked for the case of Korea.

[a] *Computed by assigning each female worker percentile ranking based on male wage distribution and the calculating the female mean of these percentiles*

Another way of exploring the change of female workers' wages relative to male workers' overtime is to assign each female worker in the sample a percentile ranking based on her position but in the male wage distribution and then compute the mean percentile. The positive change indicates that female workers are progressing in terms of moving to the higher position in the wage distribution of male workers. The last line of the table above is the result of this calculation. For Korea, the position of female worker has actually improved but very little as the change is barely positive. In 2004, female workers are comparable to male at about 28th percentile of the wage distribution and it is also the same in 2006. In Vietnam the female position is walking down in the male wage distribution but in both periods of time, the percentile ranking is much higher than that in Korea, 43rd and 42nd in two years respectively.

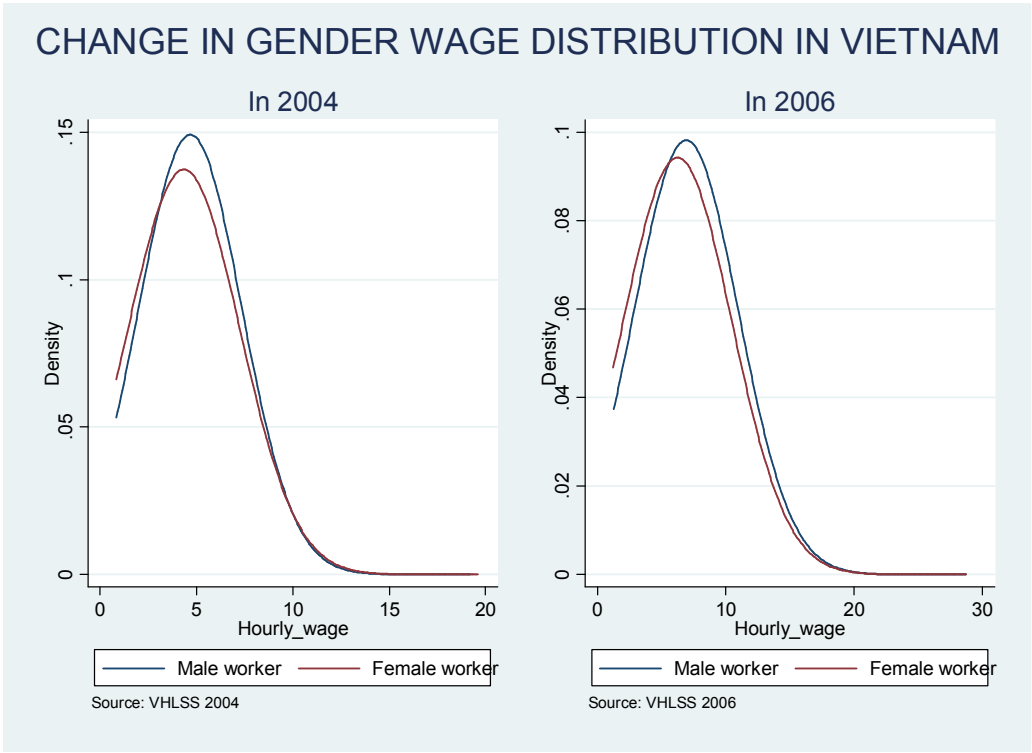
Wage distribution plotted below could be very well serving as the explanation for the findings above. It can be seen from the curves that the majority of female workers are standing on the lower position as compared to where male workers are crowded at, and more female workers are concentrated around the mean as compared to male workers. So if there happens the exogenous boost in wage level applied (e.g minimum wage hike) through out the country then apparently, effect is more on the standard measure of wage inequality for female workers which help reduces to the larger extent the wage inequality than it does for male workers. These figures also demonstrate visually clearly the difference in ranking of female wage in the male wage distribution between the two countries, as pointed out in the table. The wage distribution is quite similar in Vietnam but that in Korea is different for male and female workers

Figure 01: Gender wage distribution in Korea[a]



[a] *Wage is measured in Vietnamese Dong in hourly basic*

Figure 02: Gender wage distribution in Vietnam, 2004-2006



[a] *Wage is measured in Vietnamese Dong in hourly basic*

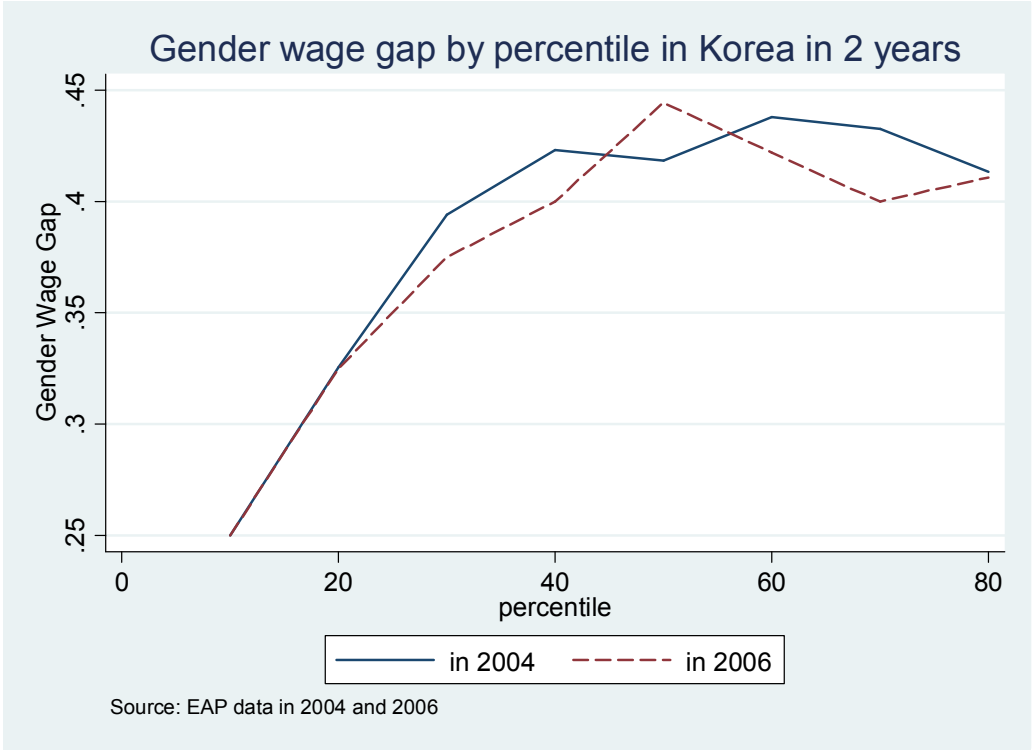
For each country, the fact that wage gap increases at a very low speed and the gradual improvement or degrading of female position does not necessarily happen through out the distribution. In other words, such change might not be spread equally across all female workers. One specific group might have the wage level moving closer to the male's wage than the other do. To seek for possible differentiated patterns of gender wage gap, one can examine the wage gap at selected percentiles over time.

Two figures below present the distribution of wage gap across percentiles of wage. For each country, there are two curves depicting the patterns in 2004 and 2006 respectively.

It can be seen from the Korea case that wage gaps tend to increase across percentile. For lower percentile which is populated with the unskilled workers working in less demanding and lower hierarchy occupations and industries, wage gap are actually relatively low as compared to average level. However, there seems to be "glass ceiling" effect observed when we are moving along the wage distribution. The wage gap found is expanding and pretty high at the top of the distribution. It could be due to existence of discrimination that holds back female workers from entering the well-paid/high skilled industries/occupation once female workers have attained certain level of education

The figure for Vietnam, however, tells us a completely different story. Wage gap is actually found highest at the bottom of the distribution and it displays a modest decrease as we move along the distribution. Though this is contrast to what have been commonly observed in transitional economies, it is consistent with the findings from earlier study by Pham, T. and Barry, R (2007) which uses the quintile regression to examine the gender wage gap using previous rounds of VHLSS data, where little "glass ceiling" effect is detected. Moreover, this is also in line with the pattern found in China where it has been proven that there is not a "glass ceiling" stopping female workers entering the high-paid levels but rather the "sticky floor" effect that female workers find it difficult to rise right from the low levels of company (Chi, W. and Li, B., 2008)

Figures 03: Gender gap by percentile in Korea in 2004 and 2006



Figures 04: Gender gap by percentile in Vietnam in 2004 and 2006

6. Decomposition analysis

6.1 Decomposition of the change in the wage gap for each country.

Since the wage gap increases have been captured in both countries, though their magnitudes are relatively small, it is worth exploring which factors have driven such changes. The gap being small is maybe, for the case of Korea, because of either little progress having been made, whatever the reform in labor market is undergoing, or simply offsetting force. In Vietnam, after a period of large contraction, wage gap seems to start a new cycle of rising. However, those negligible increases do not mean that contributive factors playing insignificant role at all. Since the observed period is relatively short, the difference might be negligible but the size and direction of contribution of various factors are still very informative in predicting the behavior of the wage gap in the long term, especially the patterns of the residual wage distribution. For the case of Vietnam, it is even more relevant because of the reverse nature of the wage gap trend. It has been discovered that until 2002 has no increase in wage gap been captured and female workers have been known to get better position in the labor market as compared to male workers.

The decomposition methodology is developed by Juhn, Murphy and Pierce (1991), which starts with wage equation being rewritten into this form

$$w_i = x_i\beta_i + \sigma_i\varepsilon_i$$

Where ε_i is the standardized residual (meaning it is distributed with zero mean and variance of one) and σ_i is the residual standard variation of wages (meaning it is the monetary value per unit difference in the standardized residual). So one can specify the wage gap as

$$w_m - w_f = (x_m - x_f)\beta_m + \sigma_m(\theta_m - \theta_f)$$

Where:

$$\theta_m = (w_m - x_m\beta_m)/\sigma_m = \varepsilon_m$$

$$\theta_f = (w_f - x_f\beta_m)/\sigma_m$$

The standardized residual for male workers, θ_m is the same as before (ε_m). The standardized residual for female workers, θ_f, is based on the male coefficient and standard deviation (or male wage distribution) (that is male price) [3]. This extended decomposition, therefore, utilizes the coefficients and variance from the male regression given the standardized error terms[4].

Therefore, the left side of the equation above is the wage gap, the right hand side includes two terms. The first one is explained gap, the second term is residual gap. When evaluated at the mean, the residual gap depends on the amount of male residual wage inequality σ_m and the mean female position in the male residual wage distribution, θ_f.

The interpretation of this decomposition is slightly different from the standard Blinder-Oaxaca decomposition for the residual gap but basically, it produces the same results in terms of total gap, predicted gap and residual gap

This JMP technique can be used to decompose the wage gap overtime. This decomposition is rising from the need to explain how much the change in wage gap is actually due to discrimination, given the relative large part of the wage gap is explained by unobserved differences. Gender discrimination might be the case but another factor of overall wage structure might enter the equation. Therefore, the extended version of JMP decomposition would allow us to describe the sources of changes in the wage gap not only tied to change in human capital but also related to the composition of residual gap.

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[3] One may be effectively reweighting the female wage equation using coefficient and standard deviation from the male wage regression, which is equivalent to predicting the average wage that female workers would receive , given their qualification, if they were paid like male.,

[4] As noted by Blau and Kahn (1996), if one uses the actual residual distribution in decomposition analysis, then there is no need for the normality on the distribution of residual

Let Δ denote the female-male difference, t and s are subscript for periods under observation, wage gap in t period could be written as follow:

$$\Delta w_t = \Delta x_t \beta_{mt} + \sigma_{mt} \Delta \theta_t$$

And the difference in wage gap between two periods, by adding and subtracting the same term, can be transformed as follows :

$$\Delta w_t - \Delta w_s = (\Delta x_t - \Delta x_s)\beta_{ms} + \Delta x_t(\beta_{mt} - \beta_{ms}) + \sigma_{ms}(\Delta \theta_t - \Delta \theta_s) + (\sigma_{mt} - \sigma_{ms})\Delta \theta_t$$

Using this method, we identify, in an accounting sense, the contribution to changes overtime in the gender wage gap which includes four terms. The first term is change in measured characteristics of female workers compared to male workers, holding market returns fixed. The second term is changes in the prices (rates of return) of measured characteristics, holding observed characteristics fixed. It means that given male workers have higher level of education, the increase (or decrease) over time in the rate of return to education will cause the gap to widen (or narrow). The third term is the difference in residual quantities which represents the change in unobserved characteristics which eventually leads to change in percentile ranking of female in the male distribution (this is the source of discrimination). The final term, reflects change in male residual wage inequality.

It could be seen that the first and the third term reflect changes in percentile ranking of female workers in the male overall wage distribution, whereas the wage structure terms (second and fourth) reflect the changes in shape of the male overall wage distribution.

One of the problems as pointed out by Suen(1997) for the JMP decomposition is the dependency of the percentile ranking of female and the male wage distribution. In other words, if inequality causes the change in male residual wage distribution to have thicker tail, then females ranking will be obviously higher even there is no changes in the female‘s residual wage position. And if there is also actual change in female percentile ranking coming along with the change in male residual inequality, then there will be no change in wage gap at all. This will be taken into consideration in the interpretation of the residual gap later.

Shift in labor demand and supply tends to offer different results on the wage gap. In other words might have either negative effect or positive effect. The negative effect comes from the fact if female workers tend to work in different occupations and industry than men (which may be due to discrimination), then this tendency will boost the return to working in the male sector and it therefore raise the male wage inequality and consequently widen the gender wage gap. Oppositely, technological change might boost

the demand might potentially affect the labor demand of female workers that which eventually benefits women and helps reduce the wage gap (Welch, 2000, Blau and Kahn, 1997)

Before looking at the decomposition analysis results, we first consider some other statistics about the residual inequality which are presented in the table below. Residual inequality is the factor that reflects the wage dispersion among the workers with the same level of education and experience and it has been documented that this is the main source for the overall wage inequality growth suggested by JMP decomposition. Recalling that JMP decomposition often explains the wage gap by two main terms, the first one is the change in human capital quantities and prices and the second one is the residual gap. This residual gap is, therefore, including the change in quantity and prices of the unobserved characteristics.

It has been well recorded in developed countries that residual inequality is often larger when the workforce becomes more educated. It means that among workers with the same human capital, when average education level of the whole labor force increases overtime, within group inequality tends to rise. It is proven here for the case of workers in Korea as the residual differentials increase overtime for both male and female workers. Additionally, sign of discrimination is also captured by 90-50 residual differential of female workers being always higher than the 50-10 differential. In other words, female workers once already completed the high level of education, or got the certain years of experience, tend to face fiercer inequality, which means that other factors beside education and experience, such as discrimination, play more of the important role which differentiate one female worker's residual wage level over the other's

For the case of Vietnam, the evidence is quite mixed if we look closely at different percentiles of residual but somehow consistent with earlier findings. Residual differential tends to increase only for those with less education and experience, the group where the largest pay gap is found in previous analysis. However, if we consider the 90-10 differentials for both male and female workers, then the residual differential also increases but not much.

It is worth noting that for these two countries, the statistics confirm that the male residual gaps distribution are not very much changing indicating there isn't significant shock in the labor market structure so we are pretty confident to use the JMP decomposition.

Table 04: Residual gaps- Descriptive statistic

	Human capital				Full decomposition			
	Viet Nam		Korea		Viet Nam		Korea	
	2004	2006	2004	2006	2004	2006	2004	2006
Male residual differential [a]								
90-50	1.263	1.186	**1.190**	**1.192**	1.275	1.195	1.193	1.183
50-10	1.185	1.239	**1.332**	**1.362**	1.181	1.257	1.290	1.321
Female residual differential [b]								
90-50	1.262	1.214	**1.444**	**1.452**	1.211	1.169	1.370	1.385
50-10	1.230	1.282	**1.074**	**1.097**	1.225	1.263	1.125	1.164
Female/Male wage ratio (after controlling for Xs)	0.868	0.841	0.671	0.654	0.843	0.838	0.669	0.657
Mean female residual from male wage regression	-0.280	-0.339	-0.612	-0.632	-0.304	-0.351	-0.748	-0.773
Mean Female residual percentile[c]	0.417	0.398	0.330	0.320	0.414	0.399	0.299	0.291

[a]. *Standard residuals taken from male regression for each country in each year*

[b]. *Standard residuals taken from female regression for each country in each year*

[c]. *Calculated by assigning the female worker residual percentile ranking the percentile based on residual male wage distribution and then calculating the mean of these residual-based percentiles*

Human capital specification includes controls for experience, experience squared, years of schooling, and years of schooling squared. The full decomposition refers to specification that, in addition, contains industry (5) and occupation (10) dummies

Below is the decomposition result. We present here dynamic decomposition for each country over time for each country, two specifications are presented. The first one is the human capital model including variables of experience, schooling and their squared terms. The second one includes further the industrial and occupation dummies. As discussed above, the inclusion of dummies of industry and occupation allows us to capture the industry or occupation shift which partly reflects the change in labor demand. More specifically, the extent of supply and demand shifts often means the extent of gender differences in occupation and industry and the direct effect of this shift will be

captured in the portion of wage gap due to changes in gender differences in occupations and industries. Negative effect would be captured by the changes in prices whereas the unexplained portion might be including the factors that have positive effect on the wage gap.

The structure of decomposition results for each country is presented in a shape that the first panel is the JMP decomposition for single year[5] and the second panel is the decomposition of changes in wage gap. On top of the JMP decomposition for change in wage gap, there are two main terms, predicted gap and residual gap. Each term is then divided into to sub-terms, observed price and observed X for predicted gap, and gap effect and unobserved prices effect for residual gap. Either observed characteristic or observed price is also decomposed into more details of how much the change in quantity and price of each variable inserted in to the equation explain the wage gap. So for the human capital model, there will be 4 other factors whose differences contribute to the different extend to the overall wage gap. For the full decomposition, there will be other factors of occupation or industry change in difference in quantities and prices. It should be noted that coefficients of male- in- 2004 regressions are selected as references for calculation

Looking at the table, it could be interpreted that in 2004, wage gap in Vietnam is 0.11 log point. Female workers are actually having higher level of human capital and it therefore helps reduce the wage gap. The residual gap is still very high which means discrimination is the main factor explaining the wage gap in this specific year. Furthermore, looking overtime, the wage gap increases to 0.14 log points in 2006 and at this time, difference in human capital is in less favor of female workers and the difference due to discrimination is going upward. It means, the fact that female workers being superior in education, though still contributing to decrease the wage gap, is now offset by the discrimination arising which is going against the female workers. This pattern seems to hold for a long period of time since analysis using earlier rounds of VHLSS also captured the same thing (Amy Liu, 2004). This is confirmed when we move to the decomposition of changes presented below

Overtime, as the wage gap actually increases, the JMP decomposition shows that changes in gender differences in human capital played a role in widening the wage gap. However, there is differentiated pattern among human capital variables. Change in gender difference in education actually reduces the wage gap whereas change in gender experience difference seems to broaden the wage gap. Using the full decomposition

[5] Blinder Oaxaca decomposition produces the same results that wage gap is explained by two terms but the interpretation is somewhat different for the second term

taking into account additionally occupation and industry shift, the trend is almost the same for human capital. By summing up all values of occupations or industry, it is found that both are positive indicating that gender shifts in either occupation or industry actually widen the wage gap[6]

About the prices of observed characteristics, price change in human capital is negative which means that it contributes to narrowing the wage gap over the studied period. Both experience and schooling have this role. Extending the decomposition, price changes for industries and occupation help reduce the wage gap. In other words, compressing nature of wage differences across industries or occupations keeps the wage gap from rising.

Both specifications show that gap effect and unobserved price are positive and their magnitudes are really large compared to observed characteristics and prices. It means that they are the factors that contribute mostly to the widening of wage gap[7]. In order to interpret these two terms, we need to look at the table 04 which presents the mean percentile ranking of female workers in residual male wage distribution. The mean female percentile ranking is 41st in 2004 implying that in this year, controlling for human capital female workers are comparable to the male counterparts at about the 41st percentile of male residual wage distribution. However, female workers position in male residual distribution has somewhat decreased to 39th percentile in 2006. So the decomposition indicates that if each female worker in 2004 were still in the same percentile in the male residual distribution, gender gap could still increase by 0.0028 log point (i.e the unobserved price effect). But due to the fact that female workers advanced up in the male residual distribution then this movement further increase the wage gap by 0.0249.

This finding lends further supporting evidence that discrimination is still the main factor behind the wage gap increase as found in the previous analysis in Vietnam. However, in contrast to earlier findings, male residual wage inequality is actually rising which prevents the wage gap from narrowing

The inclusion of industry and occupation clearly helps explain more about the predicted gap leaving the rest of changes in differences of unobservable characteristics falling into the residual gap. It means that, further controlling for the occupation/industry difference in quantity and prices, the residual gap is declining but still is the most

[6] One can calculate further the percentage of contribution of certain factor to the change in wage gap by dividing the factor's decomposition value by the sum of values with the same sign (i.e positive or negative). We are more interested in the direction than the magnitude, given the wage gap is small

[7] Note that these two factors could be calculated alternatively by computing the mean percentile ranking of female workers in the male wage residual

important source of wage gap, and the decrease can be found in both in female ranking and male residual wage inequality. In other words, discrimination, if there is any, which leads to occupation and industry segregation decreases female ranking but raises the male wage residual inequality.

In summary for Vietnam, this period of time exhibits different trend in wage gap but pretty much the same patterns of the contribution of various factors to the wage gap, comparing to previous time span between 1992 and 1998. Education is still playing the role of hindering the wage gap expansion whereas decrease in human capital returns gaps still narrow the wage gap. Gap effect keeps the same trend that it fosters the widening of wage gap with the large magnitude suggesting the discrimination. Occupation/industry segregation as a result of discrimination increase both female ranking and male wage residual inequality. Male residual wage inequality is also performing an opposite trend compared to the past[8]. Our analysis comes off that male residual wage inequality is indeed rising which causes the wage gap to increase.

[8] Liu, Amy(2004) found that negative unobserved effect actually suggests the falling male residual wage inequality, which reduces the wage gap in the period of 1992-1998

Table 05: Decomposition of changes in wage gap for Vietnam using VHLSS data in 2004 and 2006[a]

Total difference male – female		Predicted gap				Residual gap			
		Human capital		Full decompostion		Human capital		Full decompostion	
2004	0.1184	-0.0115		-0.0184		0.1299		0.1369	
2006	0.1460	-0.0112		-0.0108		0.1573		0.1569	
		0.0002		0.0076		0.0273		0.0200	
	Change in Wage gap	Observed X	Observed Price	Observed X	Observed Price	Gap Effect	Unobserved Price	Gap Effect	Unobserved Price
	0.0276	**0.0035**	**-0.0028**	**0.0081**	**-0.0043**	**0.0249**	**0.0028**	**0.0196**	**0.0013**
Schooling		0.0002	-0.0009	0.0011	-0.0011				
Schooling squared		-0.0051	-0.0020	-0.0026	0.0016				
Experience		0.0187	0.0029	0.0145	0.0027				
Experience squared		-0.0136	-0.0029	-0.0087	-0.0029				
Mining and quarrying				0.0017	0.0000				
Manufacturing				-0.0061	0.0026				
Service				0.0011	-0.0035				
Top level professionals				0.0014	-0.0008				
Middle level professionals				0.0027	-0.0005				
Staff, white collar				0.0033	0.0019				
Skilled worker in service				-0.0004	-0.0005				
Skilled worker in agriculture and aquaculture				0.0022	-0.0008				
Skilled handicraftment				0.0004	-0.0023				
Assembler and machine operator				0.0018	0.0002				
Unskilled worker excluding army				-0.0043	-0.0008				

[a]: *all the differences are presented in log term, human capital refers to model with experience and schooling and their squared terms , whereas full decomposition refers to specification that includes, in addition, industrial and occupation dummies*

For the case of Korea, the wage gap found is approximately 0.46 log point in both 2004 and 2006. Almost one third of the difference in wage between male and female is

explained by difference in human capital, the rest is due to difference in residual gap. Considering the low percentile ranking of female residual in male residual wage distribution in the table 04 above, this result further supports the conclusion that wage gap in Korea is still tied to discrimination.

Looking at the decomposition over time, changes in observed quantities as a whole reduces the wage gap. More specifically, changes in gender difference in human capital , either in a form of education or potential experience, hinder the expansion of wage gap. However, after controlling for the differences in human capital, occupation shifts also lead to the expansion of the wage gap. With the findings by recent analysis of Hwang, A. and Polachek, A (2004), which state that occupation segregation is negatively affecting the wage gap (i.e increase the wage gap), this evidence would further imply that change in gender difference in occupation distribution might still be the source of wage gap increase in the future. It should be cautioned that, due to the endogeneity of occupation dummies, by this inclusion, we simply overlook discrimination/personal occupation preferences happening in the female selection of occupation, if there is any.

Regarding observed prices, the results are interesting as it is sensitive to the inclusion of industry/occupation dummies. It could be seen that the changes in differences in returns to human capital actually play the role in the widening of wage gap. However, controlling for human capital return differences then the changes in wage differences across industries and occupations helps reduce the wage gap. And totally, the sum of differences negative is telling us that changes in observed prices contribute to decrease the wage gap overtime

Residual gap difference causes the wage gap to increase and it is still the main contributing factors to the increase of wage gap. Both components of the residual wage gap are positive. Male residual wage inequality is still rising which leads to the widening of wage gap, while there is no progress in moving upward in ranking of female workers in the male residual wage distribution.

Table 06: Decomposition of change in wage gap for Korea using EAP data 2004-2006

		Predicted gap				Residual gap			
Total difference male -female		Human capital		Full decomposition		Human capital		Full decomposition	
2004	0.461	0.157		0.125		0.304		0.336	
2006	0.462	0.140		0.109		0.322		0.353	
		-0.0172		-0.024		0.0184		0.0167	
	Change in wage Gap	Observed X	Observed Price	Observed X	Observed Price	Gap Effect	Unobserved Price	Gap Effect	Unobserved Price
	0.0012	-0.0228	0.0022	-0.0152	-0.0063	0.0073	0.0116	0.0101	0.0071
Schooling		-0.0002	0.0255	0.0004	0.0223				
Schooling squared		-0.0001	-0.0178	-0.0005	-0.0178				
Experience		-0.0302	0.0004	-0.0280	0.0003				
Experience squared		0.0077	-0.0060	0.0077	-0.0046				
Mining and quarrying				-0.0004	-0.0006				
Manufacturing				0.0048	-0.0207				
Service				-0.0025	0.0186				
Top level professionals				-0.0001	-0.0006				
Middle level professionals				0.0009	0.0014				
Staff, white collar				0.0007	0.0067				
Skilled worker in service				-0.0024	0.0043				
Skilled worker in agriculture and aquaculture				0.0012	-0.0001				
Skilled handicarftment				-0.0022	-0.0112				
Assembler and machine operator				-0.0046	-0.0078				
Unskilled worker excluding army				0.0098	0.0037				

[a]: all the difference are presented in log term, human capital refers to model with experience and schooling and their squared terms , whereas full decomposition refers to specification that includes, in addition, industrial and occupation dummies

In conclusion, for the sake of comparison between countries, it could be said that change in difference in education helps decrease the wage gap. Female ranking changes not only play the role in both countries in increasing the wage gap but also contribute to the largest extent. Change in occupation/industry differences in terms of both quantities and prices do the same thing for both countries, i.e occupation segregation increases the

gap while wage compressing reduces the gap. The only differences between countries is that difference in potential experience, holding education level fixed, actually narrows the gap in Korea but increases the gap in Vietnam

6.2. Decomposition analysis of wage gap between countries

JMP decomposition could also be used to examine the wage gap difference between two countries. The procedure is almost the same except that time differences are replaced by countries differences. In this analysis, given the representativeness of the data in both countries, we also attempt to explore the difference in wage gap between Korea and Vietnam to see why Korea has such a high wage gap given that Korean female workers favorable female workers qualification resulting from high level education system. Furthermore, it is also interesting to see the extent of how other disadvantages female workers in Korea have to face causes the wage gap to be so high in Korea. In addition, carrying out such analysis also potentially helps us explain the role of labor market differences in the wage differences. In details, it is supposed to explore how Korea places a wage penalty on individuals with below-average-productivity characteristics, compared to Vietnam.

As mentioned above, the procedure is pretty much the same in which we replace time subscript with country subscript. The decomposition formula is as follows

$$\Delta w_k - \Delta w_v = (\Delta x_k - \Delta x_v)\beta_{mv} + \Delta x_k(\beta_{mk} - \beta_{mv}) + \sigma_{mv}(\Delta\theta_k - \Delta\theta_s) + (\sigma_{mk} - \sigma_{mv})\Delta\theta_k$$

where k and v represent Korea and Vietnam respectively, and it is chosen here Vietnam as the reference country

The first term, observed quantities (X), represents the part of the wage gap that is explained by cross-country differences in the gender gap in observed characteristics. The second term, the observed prices, reflects country differences in labor market returns to characteristics. The third term, unobserved quantities (X), reflect cross country differences in percentile ranking of female worker in male residual wage distribution. This term captures the wage gap that would result if each of two countries had the same distribution of residual wage and differed only in female ranking in that distribution. The fourth term, unobserved prices, measure inter-country differences in male wage distribution. This final term can be thought of as the differences in the wage penalty for having a position below the mean in the male wage distribution

However, this cross-country JMP decomposition is subject to critics by Suen(1997) who argues that the male residual might be different in both countries so the decomposition into residual might lead to misleading results. Blau and Kahn (2003) acknowledged that conducting this decomposition study requires important assumption that female workers are influenced by the same wage-setting mechanism that affect

country distribution of male's wage, and both observed prices for male and decomposition results for residual prices for male are assumed to affect men and women in the same way.

We firstly attempt our interpretation into the differences quantities and prices in human capital to see how much it explains for the gap difference and then explore the difference in female ranking and male wage inequality with cautions. The results are presented below. We select the most recent results in 2006 for interpretation purpose as the results are similar in two years . It could be seen that the differences in gender gap in education and experience play an important role in explaining the difference in wage gap between the two countries. In other words, gender gap in Korea is larger than Vietnam because in Korea gender gaps in experience and education are larger than they are in Vietnam. Put differently, female workers are more disadvantaged in Korea than their counterparts are in Vietnam in terms of human capital level that leads to more inferior position of female workers in the male education ranking, which eventually justifies the bigger wage disadvantage of female workers in Korea.

Regarding the returns to education and experience, they are contributing to the wage gap differences between Korea and Vietnam but by a much smaller amount than the education level. Alternatively speaking, if the level of female disadvantage in education is the same in two countries, higher returns to education and experience in Korea even worsen the female workers as compare to what they do for female workers in Vietnam. This is one of the observed factors reflecting the difference in labor market characteristics but as clearly shown, it is not as we expected that it contributes insignificantly to the wage gap in Korea

The gap effect being positive means that, besides the larger education disadvantage of education, unobserved disadvantages keeps the female position in the lower in male residual wage distribution in Korea to a more extent than they do in Vietnam and this contributes to larger wage gap in Korea. This factor contributes significantly to the wage gap difference between countries with the magnitude even higher than the difference in human capital. It could be interpreted that if the male residual wage inequality is the same between two countries, in the 0.3161 log point difference, the fact that female ranking 12^{th} lower in male wage distribution Korea as compared to Vietnam contributes 0.1289 log point to the difference in wage gap between countries

Difference in male residual wage inequality is reflecting the difference in other unobserved factors and also referring to the difference in wage structure between two countries. It is surprising that this difference is not only in favor of Vietnam in determining the wage gap but also very little explains to the difference. This should be

interpreted with cautions that we are not saying either there is no differences in labor market and development between Korean and Vietnam or they do not affect the wage gap, but instead, we believe that only those differences relating to the wage structure, explains little to the wage gap difference between Korea and Vietnam

Table 07: Decomposition of difference in wage gap between Korea and Vietnam in 2004

Total difference male - female		Predicted gap				Residual gap			
		Human capital		Full decomposition		Human capital		Full decomposition	
Vietnam	0.118	-0.011		-0.018		0.130		0.137	
Korea	0.461	0.157		0.125		0.304		0.336	
	Gap	Observed X	Observed Price	Observed X	Observed Price	Gap Effect	Unobserved Price	Gap Effect	Unobserved Price
	0.342	0.123	0.024	0.162	0.027	0.144	0.014	0.190	0.004
Schooling		-0.052	-0.012	-0.047	-0.002				
Schooling squared		0.160	0.015	0.140	0.012				
Experience		-0.038	0.046	-0.038	0.036				
Experience squared		0.052	-0.026	0.049	-0.021				
Mining and quarrying				-0.002	0.001				
Manufacturing				-0.001	0.024				
Service				0.000	-0.010				
Top level Professionals				0.016	0.013				
Middle level Professionals				0.027	0.054				
Staff, white collar				-0.024	0.021				
Skilled worker in service				-0.003	-0.003				
Skilled worker in agriculture and aquaculture				0.001	0.005				
Skilled handicarftment				0.020	-0.043				
Assembler and machine operator				0.036	-0.048				
Unskilled worker excluding army				-0.012	-0.012				

[a]*: all the difference are presented in log term, human capital refers to model with experience and schooling and their squared terms , whereas full decomposition refers to specification that includes, in addition, industrial and occupation dummies*

Table 08 Decomposition of difference in wage gap between Korea and Vietnam in 2006

		Predicted gap				Residual gap			
Total difference male -female		Human capital		Full decomposition		Human capital		Full decomposition	
Vietnam	0.1460	-0.0112		-0.0108		0.1573		0.1569	
Korea	0.4621	0.1400		0.1089		0.3221		0.3530	
	Gap	Observed X	Observed Price	Observed X	Observed Price	Gap Effect	Unobserved Price	Gap Effect	Unobserved Price
	0.3161	0.1283	0.0219	0.1633	-0.0105	0.1289	0.0225	0.1289	0.0225
Schooling		-0.047	-0.018	-0.041	-0.006				
Schooling squared		0.172	0.024	0.135	0.017				
Experience		-0.071	0.044	-0.071	0.034				
Experience squared		0.074	-0.028	0.071	-0.022				
Mining and quarrying				-0.004	-0.004				
Manufacturing				0.011	0.008				
Service				-0.007	-0.022				
Top level Professionals				0.016	0.012				
Middle level Professionals				0.022	0.055				
Staff, white collar				-0.020	0.011				
Skilled worker in service				0.005	0.002				
Skilled worker in agriculture and aquaculture				-0.002	-0.004				
Skilled handicarftment				0.017	-0.047				
Assembler and machine operator				0.038	-0.056				
Unskilled worker excluding army				-0.007	0.009				

[a]*: all the difference are presented in log term, human capital refers to model with experience and schooling and their squared terms , whereas full decomposition refers to specification that includes, in addition, industrial and occupation dummies*

4. Conclusion

We use two representative data from Korea and Vietnam to examine the pattern of wage gap trends. JMP decomposition is used to explore not only changes in wage gaps overtime in both countries but also the differences in wage gap between countries in one specific year. While deterioration in discrimination is carefully investigated for the cause of changes in wage gaps, difference in labor market is paid large attention to examine the difference in wage gap between Korea and Vietnam. The findings are (i) wage gap is increasing in the period under consideration for both Vietnam and Korea but the magnitude is small, (ii) discrimination is detected in the lower part of the wage

distribution in Vietnam (sticky floor effect), whereas it is captured at the upper part of wage distribution in Korea (glass ceiling effect), (iii) Education changes help reduce the wage gap overtime in both countries, (iv) discrimination , in general, is the most important factor in the expansion of the wage gap in both countries, and (v) larger gender disadvantage is the main cause for the difference in wage gap between Vietnam and Korea

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APPENDIX

Gender-specific regression results for VietNam in 2004 and 2006

	Human Capital				Full			
	2004		2006		2004		2006	
	Male	Female	Male	Female	Male	Female	Male	Female
Year of schooling	-0.031***	-0.025***	-0.028***	-0.017**	-0.028***	-0.012	-0.024***	-0.012
	[0.006]	[0.008]	[0.006]	[0.008]	[0.007]	[0.009]	[0.007]	[0.009]
Year of schooling squared	0.004***	0.005***	0.004***	0.005***	0.003***	0.003***	0.003***	0.003***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.001]
Year of experience	0.027***	0.035***	0.029***	0.032***	0.027***	0.032***	0.029***	0.032***
	[0.002]	[0.003]	[0.002]	[0.002]	[0.002]	[0.003]	[0.002]	[0.003]
Year of experience squared	-0.000***	-0.001***	-0.001***	-0.001***	-0.000***	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Mining and quarrying					0.415***	0.420***	0.452***	0.420***
					[0.046]	[0.080]	[0.044]	[0.080]
Manufacturing					0.369***	0.373***	0.373***	0.373***
					[0.041]	[0.074]	[0.040]	[0.074]
Service					0.221***	0.304***	0.162***	0.304***
					[0.050]	[0.080]	[0.049]	[0.080]
Top level Professionals					0.038	0.180**	-0.068	0.180**
					[0.049]	[0.089]	[0.047]	[0.089]
Middle level Professionals					0.242***	0.359***	0.383***	0.359***
					[0.080]	[0.108]	[0.066]	[0.108]
Staff, white collar					0.256***	0.036	0.214***	0.036
					[0.039]	[0.080]	[0.035]	[0.080]
Skilled worker in service					0.451***	0.173*	0.455***	0.173*
					[0.041]	[0.098]	[0.040]	[0.098]
Skilled worker in agriculture and aquaculture					0.205***	0.017	0.135***	0.017
					[0.038]	[0.076]	[0.035]	[0.076]
Skilled handicarftment					0.260***	-0.035	0.259***	-0.035
					[0.051]	[0.088]	[0.049]	[0.088]
Assembler and machine operator					0.027	-0.034	0.053**	-0.034
					[0.024]	[0.036]	[0.026]	[0.036]
Unskilled worker excluding army					0.006	-0.079**	0.040*	-0.079**
					[0.027]	[0.036]	[0.023]	[0.036]
Observations	3901	2449	4100	2655	3901	2449	4100	2449
R-squared	0.18	0.32	0.22	0.34	0.22	0.35	0.28	0.35

Standard errors in brackets

** significant at 10%; ** significant at 5%; *** significant at 1%*

Gender-specific regression results for Korea in 2004 and 2006

	Human Capital				Full			
	2004		2006		2004		2006	
	Male	Female	Male	Female	Male	Female	Male	Female
Year of schooling	0.011*	-0.018***	0.029***	-0.019***	-0.022***	-0.024***	-0.006	-0.024***
	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]	[0.006]
Year of schooling squared	0.002***	0.004***	0.002***	0.004***	0.002***	0.003***	0.002***	0.003***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Year of experience	0.061***	0.015***	0.052***	0.006***	0.053***	0.025***	0.047***	0.025***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Year of experience squared	-0.001***	-0.000***	-0.001***	-0.000***	-0.001***	-0.000***	-0.001***	-0.000***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Mining and quarrying					-0.146***	-0.185**	-0.181***	-0.185**
					[0.026]	[0.090]	[0.025]	[0.090]
Manufacturing					-0.157***	-0.285***	-0.204***	-0.285***
					[0.026]	[0.091]	[0.025]	[0.091]
Service					-0.416***	-0.763***	-0.463***	-0.763***
					[0.031]	[0.091]	[0.031]	[0.091]
Top level Professionals					-0.592***	-0.540***	-0.646***	-0.540***
					[0.032]	[0.091]	[0.032]	[0.091]
Middle level Professionals					-0.584***	-0.820***	-0.906***	-0.820***
					[0.069]	[0.111]	[0.072]	[0.111]
Staff, white collar					-0.511***	-0.694***	-0.596***	-0.694***
					[0.027]	[0.093]	[0.026]	[0.093]
Skilled worker in service					-0.515***	-0.531***	-0.576***	-0.531***
					[0.027]	[0.093]	[0.026]	[0.093]
Skilled worker in agriculture and aquaculture					-0.806***	-0.773***	-0.883***	-0.773***
					[0.028]	[0.091]	[0.027]	[0.091]
Skilled handicarftment					0.366***	0.493	0.029	0.493
					[0.100]	[0.305]	[0.127]	[0.305]
Assembler and machine operator					0.259***	0.151***	-0.014	0.151***
					[0.055]	[0.036]	[0.037]	[0.036]
Unskilled worker excluding army					0.102*	0.200***	-0.191***	0.200***
					[0.055]	[0.035]	[0.036]	[0.035]
Observations	14303	10527	14109	10201	14303	10527	14029	10527
R-squared	0.29	0.29	0.28	0.3	0.42	0.39	0.42	0.39

Standard errors in brackets

** significant at 10%; ** significant at 5%; *** significant at 1%*

Summary statistics of variables

	Vietnam				Korea			
	2004		2006		2004		2006	
	Male	Female	Male	Female	Male	Female	Male	Female
Years of schooling	9.147	9.425	9.214	9.530	13.24	11.85	13.36	11.99
Year of experience	18.194	16.837	19.120	17.221	21.10	21.15	20.34	20.88
Agriculture	0.176	0.185	0.166	0.160	0.009	0.023	0.014	0.021
Mining and quarrying	0.024	0.013	0.025	0.008	0.002	0.000	0.001	0.000
Manufacturing	0.457	0.354	0.222	0.342	0.287	0.212	0.275	0.181
Service	0.342	0.447	0.587	0.490	0.702	0.765	0.710	0.797
Leaders	0.061	0.019	0.060	0.029	0.024	0.002	0.028	0.003
Top level Professionals	0.059	0.082	0.064	0.083	0.203	0.187	0.210	0.193
Middle level Professionals	0.064	0.168	0.068	0.164	0.181	0.211	0.175	0.212
Staff, white collar	0.032	0.065	0.031	0.049	0.045	0.187	0.042	0.185
Skilled worker in service	0.037	0.032	0.036	0.040	0.037	0.116	0.036	0.111
Skilled worker in agriculture and aquaculture	0.011	0.016	0.016	0.012	0.006	0.006	0.004	0.006
Skilled handicarftment	0.224	0.168	0.247	0.189	0.177	0.045	0.176	0.039
Assembler and machine operator	0.073	0.023	0.073	0.020	0.188	0.059	0.189	0.051
Unskilled worker excluding army	0.438	0.426	0.404	0.414	0.140	0.188	0.140	0.200