Gender Wage Gap and Commuting Time: An Empirical Analysis in The Jakarta Metropolitan Area

Thiraffi Akhsananta Abdillah
Department of Economics Business, Diponegoro University, Semarang, Indonesia, akhsananta@gmail.com

Ariska Nurfajar Rini
Department of Economics Business, Diponegoro University, Semarang, Indonesia, ariskanurfajarrini@lecturer.undip.ac.id

Okki Alfianto
Department of Economics Business, Diponegoro University, Semarang, Indonesia, okki524@gmail.com

Follow this and additional works at: https://scholarhub.ui.ac.id/jekk

Part of the Demography, Population, and Ecology Commons, Family, Life Course, and Society Commons, Income Distribution Commons, and the Labor Economics Commons

Recommended Citation
Abdillah, Thiraffi Akhsananta; Rini, Ariska Nurfajar; and Alfianto, Okki (2024) "Gender Wage Gap and Commuting Time: An Empirical Analysis in The Jakarta Metropolitan Area," Jurnal Ekonomi Kependudukan dan Keluarga: Vol. 1, Article 4. DOI: 10.7454/jekk.v1i1.04
Available at: https://scholarhub.ui.ac.id/jekk/vol1/iss1/4

This Article (Research result) is brought to you for free and open access by the Faculty of Economics & Business at UI Scholars Hub. It has been accepted for inclusion in Jurnal Ekonomi Kependudukan dan Keluarga by an authorized editor of UI Scholars Hub.
Gender Wage Gap and Commuting Time: An Empirical Analysis in the Jakarta Metropolitan Area

Thiraffi Akhsananta Abdillah*, Ariska Nurfajar Rini*, Okki Alfianto*
*Department of Economics and Business, Diponegoro University, Semarang, Indonesia

(Received: October 28, 2023 — Accepted: January 4, 2024 — Published: January 30, 2024)

Abstract

This study aims to analyze the role of commuting time in explaining the gender wage gap in the Jakarta Metropolitan Area. This study presents an analysis of the gender wage gap as well as its explained and unexplained components using the Blinder–Oaxaca method with data provided by the 2019 Jakarta Metropolitan Area Commuter Survey. The addition of commuting time as one of the explanatory factors is a novel aspect of the analysis. Two different methods, known as ordinary least squares and the Heckman selection model, are used to estimate wage equality for men and women. Depending on the method, estimates of the gap range from 3% to 11%. The decomposition of the gap reveals that between 2% and 3% of the gap is explained by the worker characteristic known as the endowment factor, while 7% to 12% of the gap is unexplained. This shows that the contribution of the unexplained factor to the income gap between genders is greater than the endowment factor. Commute time is found to account for 0.4% of the logarithmic wage gap, as explained by the worker characteristics. Results clearly identified that women have shorter average commute times compared to men, which may be due to women’s willingness to be paid less as their compensating for shorter commute times.

Keywords: gender wage gap, commuting, Blinder–Oaxaca decomposition

Introduction

The gender wage gap, which refers to the disparity between women’s and men’s wages at an equivalent level of productivity, is one of the most challenging issues in the labor market. The gender wage gap is generally caused by breaking the principle of equal pay for work of equal value due to the same task performed by people of different gender should require the same level of accountability, expertise, experience, and readiness in both an intellectual and physical sense (Daki & Savi, 2017).

Previous study shows that at the international level the gap has trended downwards, but the rates at which man and woman wages are converging are heterogeneous, at least among developed countries (Kunze, 2018). According to the International Labour Organization (2020), women in Indonesia have 23% lower income than men meaning that if the average wage for men is 3.18 million rupiah per month, then the average wage for women is only 2.45 million rupiah per month. Additionally, men are more likely than women to hold high-paying occupations, where woman employees with a bachelor’s degree make significantly less money than man employees.

A range of factors that might explain the differential has been proposed in the literature. These include factors such as the state of human capital, employment status, and socio-logical and non-cognitive phenomena (Blau & Kahn, 2017; Redmond & McGuinness, 2019). Differences in psychological attributes, such as attitudes towards risk, competition and negotiation, are well documented but only explain a small fraction of the gender pay gap (Blau & Kahn, 2017; Bertrand, 2018). Recent evidence highlights that family and fertility decisions may be an important driver of the gender pay gap. Having children typically leads to career interruption for women but not men, which may explain some of the gender pay gap (Kleven et al., 2019). In addition, the difficulty for women to combine work and family, especially to work long or hours, could further...
explain the gender pay gap (Goldin, 2014; Goldin & Katz, 2016).

According to Borjas (2016), gender wage gaps occur because women and men experience job segregation in the labor market caused by segregation and the human resource model. Women are deliberately separated into certain occupations or what are known as the occupational crowding hypothesis. Separation of this type of work is not always discrimination by male employers, but it can also be the result of the social structure of the society where girls are taught that there are jobs that are not suitable for a woman so that they are channeled to jobs that are deemed appropriate. The accumulation of women into a relatively small number of jobs certainly reduces wages and results in a gender wage gap.

Despite the many sexist influences that cause job segregation, the human resource model provides alternative explanations from the labor supply side related to women's choice of certain jobs and avoids certain types of work. There are jobs (teachers or childcare workers) that require unnecessary skills to be updated frequently and there are jobs that require skills that must be updated frequently (concert pianists or nuclear physicists). Human capital (skills) will be more profitable if the longer the payment period during which the investment results can be collected. Men can generally participate in the labor market throughout their lives, then human capital obtained by men has a longer payback period. On the contrary, women should devote time to the household sector, thereby shortening the return period and reducing the profits from the investment. The discontinuity of women's labor supply during the life cycle results in a gender wage gap for two different reasons. First, this creates a difference in wages because men tend to get more human capital. Second, the period of raising children increases the wage gap because women's skills tend to depreciate during this period (Borjas, 2016).

Commuting to work is done every day by millions of workers, enabling and increasing access to jobs that are not always close to where someone lives. However, travel time long periods can hurt workers' health and productivity, especially in countries with lots of traffic jams. Women are also less likely to need to travel longer, especially after marriage. In addition to other factors, longer commutes make work more uncomfortable for women especially those who have more household responsibilities. Here are why gender gaps in commuting times exist in most countries. Even though commute times are a factor that considerably varies between men and women, very few research have studied their impact. For instance, in OECD nations, women's commutes are typically 33% shorter than men's commutes (Le Barbanchon et al., 2021). Studies of differences between men and women in commuting patterns go back several decades. Their results suggest that women tend to have shorter commutes than men both in time and distance (Madden, 1981). According to this literature, these differences are explained by women's role in the home which must be coordinated with the demands of their job (known as the house responsibility hypothesis), and their lower wage rates that do not justify longer trips to work. Madden (1985) suggests that women choose jobs closer to their homes because of their responsibilities at home which leads to lower incomes and fewer working hours. For their part, Le Barbanchon et al. (2021) find that the gender gap in both reservation wage and travel time increases for women with children, as well as with age.

Two perspectives argue the factor of commuting time to the gender wage gap. The first perspective argues that women tend to be inelastic in commuting time to obtain higher wages. Wuestenken & Begall (2022) find that commuting time is insignificant in compensating for some monetary factors to obtain non-monetary factors. They argue that women might be indifferent to the monetary factor and non-monetary factors as their expression in compensating the extra-wage. Some evidence suggests that women tend to favor jobs with greater flexibility and fewer hours, at the expense of pay (Wiswall & Zafar, 2018). More generally, women may value non-pecuniary job characteristics more than men (Manning, 2013). This hypothesis is consistent with the finding that women's labor supply at the firm level is less wage elastic than men's due to women's job choices are less driven by salary than men's (Webber, 2016). The second perspective believes otherwise. Goldin (2014) has shown that woman workers are more willing to give up higher wages in exchange for jobs that offer more non-wage amenities, such as flexible and predictable hours, compared with men workers. Because these amenities often come with wage penalties, the gender difference in preferences for non-wage amenities could lead to a gender wage gap (Goldin, 2014).

Moreover, Le Barbanchon et al. (2021) show comparable evidence on the age profile of wage and commuting gaps using administrative data on unemployed jobseekers in France. They combine self-reported information on acceptable wage offers
and acceptable commutes during job searches with information on post-unemployment outcomes in wages and commuting distances. Gender gaps in reservation wages, post-unemployment wages, acceptable commutes, and realized commutes all widen with age, and an important portion of these gaps are related to the presence of children.

Another evidence found from the United Kingdom which was recently published by Nafiyan (2019) shows that man and woman employees spend on average of 32.5 and 25 min, respectively, in their one-way commute to work, while both men and women commute have been gradually rising over time, the associated gap has been stable. Evidence also shows that women are more likely than men to quit their jobs over a long commute (Nafiyan, 2019; Henrique, 2021). If women are restricted in their search for higher paying job opportunities, they may face more monopsonistic labor markets than men and, given labor market conditions, they may be more willing to accept lowering their wage reservation for shorter commute time.

Several studies have identified the existence of a gender wage gap in Indonesia (Hennigusnia, 2014; Sohn, 2015; Sukma & Kadir, 2019). The general finding from the results of this research is the high proportion of unexplained wages between men and women, which indicates the existence of substantial discrimination. Sohn (2015) argues that the high proportion of unexplained passages can be caused by a lack of observable characteristics. The addition of an explanatory variable in the form of travel time is expected to improve the understanding of gender wages in Indonesia. Recent research conducted by Paramayudha (2023) using data from the 2019 National Employment Survey, has included a travel time variable and found that increasing women's travel time has the potential to reduce gender wages in Indonesia.

Campana and Nadal (2023) conducted in four Latin countries (Peru, Ecuador, Chile, and Colombia) showed that women spend less time on activities than men, both in urban and rural areas. We estimate the impact of longer commute distances on annual earnings and find that, on average, increasing commute distances decreases female workers' annual earnings by 21.3 percentage points compared with male workers at baseline. Ehab (2018) shows in Egypt that increasing travel time to work has a positive impact on women's wages. Word Bank (2021) reports that in Mumbai (India) 80 percent of trips are made by men but only 17 percent of women's trips are work-related, reflecting the low participation of women in the workforce in Mumbai, where only one-fifth of women work.

Travel time is measured as the time required to travel from home to work one way. Travel costs consist of monetary and time costs. Travel time is said to be a better measure of travel costs than travel distance. This assumes that time lost in round trips is a major component of travel costs (Gutiérrez-i-Puigarnau and Van Ommeren, 2015). Recent research conducted by Paramayudha (2023) using data from the 2019 National Employment Survey, has included a travel time variable and found that increasing women's travel time has the potential to reduce gender wages in Indonesia. The novelty of our research is the use of commute time variables to explain the gender wage gap in Indonesia. Apart from that, our research also uses data sourced from the 2019 edition of the Indonesian Commuter Survey conducted by the Statistics Indonesia (BPS).

Jakarta Metropolitan Area which consisted of Jakarta, Bogor, Depok, Tangerang, and Bekasi is an area where commuting is growing rapidly. The outskirt of Jakarta or known as Bodetabek (Bogor, Depok, Tangerang, and Bekasi) becomes home to many previous residents of Jakarta, which causes the city's population growth rate to be significantly slower and declining than that of outskirt area (Firan, 1996).

This study presents an analysis of the gender wage gap in the Jakarta Metropolitan Area, Indonesia which aims to fill the gap of research in gender wage gap. The method employed, originally proposed by Oaxaca (1973) and Blinder (1973), is used to decompose the gap into the portion explained by observable factors and the unexplained portion, the latter also interpreted as the measure of unobservable factors. Among the variables considered as explanatory factors is travel time to work, that is, commute time. This variable and the different valuations of it by men and women may explain a considerable part of the gap (Le Barbanchon et al., 2021).

**Methods**

The difference in average wages received by male and female workers is a simple comparison to measure the level of wage gap between genders. However, this method has weaknesses because it ignores important factors, such as differences in characteristics between women and men as well as bias or discrimination in the labor market (Chamberlain, 2016). Therefore, analytical methods are needed to concretely identify
wage differences between genders. One way is by applying the Blinder-Oaxaca decomposition method. The analysis used in this research was carried out in stages, starting with ordinary least squares (OLS), the Heckman selection model, and finally Blinder-Oaxaca decomposition analysis.

To implement the methodology developed by Oaxaca (1973) and Blinder (1973) for decomposing the gender pay gap, wage equations are estimated for each population group, or men and women in the presented. Mincer (1974) proposes income models in logarithms as a function of human capital, expressed as the sum of a linear function of schooling, and a quadratic function of potential work experience.

Since then, this specification has been the workhorse for most of the empirical work on the determination of income. This base specification is usually complemented by other relevant variables in determining income (as proposed by Mincer in his seminal work), depending on the objective of the study or the availability of data. It is assumed that the equation for men represents a non-discriminatory relationship between worker characteristics and wage rates. The equations are as follows:

\[
\log(wage_i^M) = a_0 + \beta_1 \text{commute}_i^M + \beta_2 \text{yeduc}_i^M + \beta_3 \text{exper}_i^M + \beta_4 \text{exper}^{2M}_i + \sum_{k=1}^{n} \theta_k C_k^M + u_i
\]

\[
\log(wage_i^F) = a_0 + \beta_1 \text{commute}_i^F + \beta_2 \text{yeduc}_i^F + \beta_3 \text{exper}_i^F + \beta_4 \text{exper}^{2F}_i + \sum_{k=1}^{N} \theta_k C_k^F + u_i
\]

The subindexes M and F indicate men and women, respectively. The dependent variable Y in both cases is the logarithm of the wage rate and the explanatory variables X include years of education, potential experience and its square, commute time, and the dichotomous variables representing the presence of a partner and the presence of children. The control variable consisted of house ownership, and difficulty are also included to minimize the potential heteroskedasticity. With the exception of commute time, the particular focus of the present analysis, these explanatory variables are the same ones typically found in other wage gap studies.

Equations (1) and (2) are expressed at the individual level and do not include further controls for household characteristics. In this way, it is expected that the error term of the model contains an unobservable household effect, as suggested in Gutierrez (2018). The wage gap is defined as the difference between the average wage rates of men and women which can be formulated as follow:

\[
gap = \log(wage_i^M) - \log(wage_i^F)
\]

In decomposing total wage differences, the equation needs to be adjusted to the counterfactual average wage using the male group as the reference group or also called male-based decomposition. This method conditions that women must be paid according to the wage structure of men. This method assumes that men receive wages based on marginal product, while women face wage discrimination.

Once the β parameters in Equations (1) and (2) have been estimated, predictions of the average wage rates for men and women are obtained as follows:

\[
\log(wage_i^M) = \hat{\beta}_1 X_i^M
\]

\[
\log(wage_i^F) = \hat{\beta}_1 X_i^F
\]

It is expected that wage discrimination is only directed against women and there is no (positive) against men; hence, to utilize the decomposition, Equation (3) can be rewritten as:

\[
gap = \left( \overline{X}_i^M - \overline{X}_i^F \right) \beta_1 + \overline{X}_i \left( \beta_1 - \hat{\beta}_1 \right)
\]

In the Blinder-Oaxaca decomposition method, the wage equation is decomposed into two parts, an explained gap and an unexplained gap. The first term on the right-hand side of Equation (6) is the explained portion of the gap, which is related to the differences in men’s and women’s characteristics evaluated by the non-discriminatory. The second term on the right-hand side of Equation (6) expresses the unexplained portion of the gap or also called the residual gender wage gap is a difference in wages between men and women that cannot be explained by differences in human resources and is often considered a factor in wage discrimination carried out by employers. The latter can also be calculated as a residual so the aggregate decomposition can be obtained without estimating the parameters for the equation corresponding to the group exposed
to discrimination (in this case, the wage equation for women). However, to measure the contribution to the unexplained gap of each explanatory variable, their coefficients do need to be estimated.

The explanatory variables considered for the wage equations are similar to those of previous works that also use the Oaxaca-Blinder framework such as Redmond & McGuinn (2019) and Troncoso et al., (2021). The main difference is the inclusion of commuting time as an additional explanatory variable. To estimate equations (1) and (2) we use two different econometric approaches: ordinary least squares (OLS) as a basic analysis and the Heckman selection model. The ordinary least squares method aims to obtain a wage estimation model and examine the influence of independent variables on the amount of wages separately for each gender. The latter methodology is utilized to address the selection bias that might influence the total sample of women. In this analysis, we consider some factors: education, age, household size, being a household head, and the presence of a child. According to Heckman's selection model, we obtain class balance for the men and women sample which figure in Table 2.

The data used in this study is secondary data gathered from the results of the Commuter Survey conducted by Statistics Indonesia which was held in 2019. This year was chosen because it is the last year before the Covid-19 pandemic emerges, which greatly affects overall commuting patterns. The survey covered 13 districts/cities located in three provinces on the island of Java, namely DKI Jakarta Province (Central Jakarta City, West Jakarta City, South Jakarta City, East Jakarta City, North Jakarta City), West Java Province (Bogor Regency, Bogor City, Depok City, Bekasi Regency, and Bekasi City) and Banten Province (Tangerang Regency, Tangerang City, South Tangerang City).

There were 42,593 respondents and 12,960 households in the survey's overall sample. Data selection is then conducted to create a sample that is consistent with the study's goals and unit of analysis. Individual household members who commute in the Jakarta Metropolitan Area in 2019 with their primary activities to be work, travel using the same mode of transportation to get to and from those locations, and above 18 years old are the study's unit of analysis.

In Table 1, the variables Wage, Years of Education, Experience, and Commute Time are non-dummy variables so it uses the mean. The variables Partner, Child, House, and Difficulty are dummy variables so it uses the mode. The percentage value in the descriptive statistic table is only found in variables classified as dummy variables.

**Results and Discussion**

**Baseline Estimation**

The parameter estimates for Equations (1) and (2) that were obtained using OLS and Heckman are shown in Table 2. As can be seen, the commute times for OLS and Heckman approaches are positive. These results imply that workers with longer commuting times will have higher wages for both men and women. By comparing the estimation results for men and women, the marginal impact of travel time is greater for women than men, which means that women have a higher return to commuting. This finding is consistent with French et al. (2020) who stated that commuting time is positively correlated with wages.

However, the coefficient of travel time on wages in the paper is different from the findings of Troncoso et al. (2021). They found that travel time has a negative correlation with wages. Levinson (1998)

---

**Table 1**

Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>Obs</th>
<th>Mean / (Mode)</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wage (Ln)</td>
<td>1.058</td>
<td>5.134</td>
<td>0.549</td>
<td>12.89</td>
<td>17.727</td>
</tr>
<tr>
<td>Years of Education</td>
<td>1.333</td>
<td>13.227</td>
<td>2.774</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Experience</td>
<td>1.333</td>
<td>12.281</td>
<td>11.230</td>
<td>-2</td>
<td>58</td>
</tr>
<tr>
<td>Commute Time</td>
<td>1.333</td>
<td>54.757</td>
<td>32.747</td>
<td>5</td>
<td>200</td>
</tr>
<tr>
<td>Partner</td>
<td>1.333</td>
<td>0 (69%)</td>
<td>0.490</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Child</td>
<td>1.333</td>
<td>0 (67%)</td>
<td>0.495</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>House</td>
<td>1.333</td>
<td>0 (79%)</td>
<td>0.402</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Difficulty</td>
<td>1.333</td>
<td>0 (92%)</td>
<td>0.363</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Analyzed from Commuter Survey 2019
<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th></th>
<th>Heekman</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>CommuteTime</td>
<td>0.00152***</td>
<td>0.00201***</td>
<td></td>
<td>0.00157***</td>
</tr>
<tr>
<td></td>
<td>(0.00029)</td>
<td>(0.00046)</td>
<td></td>
<td>(0.00029)</td>
</tr>
<tr>
<td>Veduc</td>
<td>0.0876***</td>
<td>0.0857***</td>
<td></td>
<td>0.0870***</td>
</tr>
<tr>
<td></td>
<td>(0.00428)</td>
<td>(0.00660)</td>
<td></td>
<td>(0.00423)</td>
</tr>
<tr>
<td>Expp</td>
<td>0.00513</td>
<td>0.0250***</td>
<td></td>
<td>0.00009</td>
</tr>
<tr>
<td></td>
<td>(0.00419)</td>
<td>(0.00497)</td>
<td></td>
<td>(0.00419)</td>
</tr>
<tr>
<td>Expp2</td>
<td>0.00006</td>
<td>-0.000443***</td>
<td></td>
<td>0.00011</td>
</tr>
<tr>
<td></td>
<td>(0.00009)</td>
<td>(0.0014)</td>
<td></td>
<td>(0.00008)</td>
</tr>
<tr>
<td>Partner</td>
<td>0.198***</td>
<td>0.0441</td>
<td></td>
<td>0.0815***</td>
</tr>
<tr>
<td></td>
<td>(0.02950)</td>
<td>(0.03500)</td>
<td></td>
<td>(0.03150)</td>
</tr>
<tr>
<td>Child</td>
<td>-0.0394</td>
<td>-0.0394</td>
<td></td>
<td>-0.0173</td>
</tr>
<tr>
<td></td>
<td>(0.02050)</td>
<td>(0.03150)</td>
<td></td>
<td>(0.02080)</td>
</tr>
<tr>
<td>House</td>
<td>0.0666***</td>
<td>0.0668***</td>
<td></td>
<td>0.0919***</td>
</tr>
<tr>
<td></td>
<td>(0.01950)</td>
<td>(0.03330)</td>
<td></td>
<td>(0.01990)</td>
</tr>
<tr>
<td>Difficulty</td>
<td>-0.0519</td>
<td>-0.0398</td>
<td></td>
<td>-0.051</td>
</tr>
<tr>
<td></td>
<td>(0.03240)</td>
<td>(0.04380)</td>
<td></td>
<td>(0.03230)</td>
</tr>
<tr>
<td>_Cons</td>
<td>13.86***</td>
<td>13.77***</td>
<td></td>
<td>14.09***</td>
</tr>
<tr>
<td></td>
<td>(0.06280)</td>
<td>(0.06880)</td>
<td></td>
<td>(0.06860)</td>
</tr>
</tbody>
</table>

N = 2,601

Standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

<table>
<thead>
<tr>
<th></th>
<th>select</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Veduc</td>
<td>-0.0113</td>
<td>0.0650***</td>
<td></td>
<td>(0.00778)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.000472</td>
<td>0.0356***</td>
<td></td>
<td>(0.00244)</td>
</tr>
<tr>
<td>Num_hos</td>
<td>0.137***</td>
<td>-0.188***</td>
<td></td>
<td>(0.01790)</td>
</tr>
<tr>
<td>Head</td>
<td>1.854***</td>
<td>-2.198***</td>
<td></td>
<td>(0.06670)</td>
</tr>
<tr>
<td>Child</td>
<td>-0.0277</td>
<td>0.219***</td>
<td></td>
<td>(0.06415)</td>
</tr>
<tr>
<td>_Cons</td>
<td>-0.786***</td>
<td>-1.364***</td>
<td></td>
<td>(0.13700)</td>
</tr>
<tr>
<td>Athrho</td>
<td>-0.462***</td>
<td>0.11100</td>
<td></td>
<td>(0.06690)</td>
</tr>
<tr>
<td>Insignma</td>
<td>-1.777***</td>
<td>-1.777***</td>
<td></td>
<td>(0.02570)</td>
</tr>
</tbody>
</table>

N = 4,205

Standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Source: Analyzed from Commuter Survey 2019
explains that people with higher wages have more access to better mobility options and thus shorten their travel distances. Another plausible explanation is that people with higher wages can afford housing close to their workplace. Additionally, according to Rukmana & Ramadhani (2021), there is residential and work segregation in Jakarta’s inner periphery and municipal areas. This shows that residence would be a good predictor of household features (both observable and unobservable) which is consistent with our findings.

As for schooling and experience, the effects are similar for men and women and with all two estimation methods. In terms of education, both men and women show a positive value, which means that the higher the education, the greater the income that will be obtained. This is certainly in line with Human Capital Theory that education is a proxy for worker productivity, where the higher the education, it is assumed that the greater the productivity for the company.

Marital status has a positive influence, but it is only significant for men. This is supported by the fact that reconciliation between taking care of the family and working is an important part of analyzing gender inequality in the economy where a married woman must choose between taking care of the family or working (Kemen PPS, 2016). Meanwhile, a married man will be the head of the family, so he does not have to choose between working or taking care of the household.

The values vary within the estimate approach, and they are higher when participation is controlled using Heckman. The Heckman method also produces the only significant value for men that have a house. Lastly, having children impacts negatively both men and women but not significantly, this might be correlated the motherhood wage gap may not be caused by a compensating effect between monetary and non-monetary rewards, but by mothers being more likely than childless women and men to apply for jobs with less wage (Wuestenek and Begall, 2022).

Table 3
Blinder–Oaxaca Decomposition

<table>
<thead>
<tr>
<th>OLS</th>
<th>Blinder–Oaxaca Decomposition</th>
<th>Heckman</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>15.35***</td>
<td>Male</td>
<td>15.35***</td>
</tr>
<tr>
<td></td>
<td>(0.01100)</td>
<td>(0.01100)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>15.31***</td>
<td>Female</td>
<td>15.24***</td>
</tr>
<tr>
<td></td>
<td>(0.01690)</td>
<td>(0.01930)</td>
<td></td>
</tr>
<tr>
<td>Difference</td>
<td>0.0067*</td>
<td>Difference</td>
<td>0.114***</td>
</tr>
<tr>
<td></td>
<td>(0.02020)</td>
<td>(0.02230)</td>
<td></td>
</tr>
<tr>
<td>Decomposition</td>
<td>Explained Commute Time</td>
<td>Explained Commute Time</td>
<td>0.00460**</td>
</tr>
<tr>
<td></td>
<td>0.00453**</td>
<td>(0.00224)</td>
<td>(0.00227)</td>
</tr>
<tr>
<td>Unexplained Commute Time</td>
<td>-0.0220</td>
<td>Unexplained Commute Time</td>
<td>-0.0102</td>
</tr>
<tr>
<td></td>
<td>(0.0304)</td>
<td>(0.0091)</td>
<td></td>
</tr>
<tr>
<td>Explained</td>
<td>-0.0333*</td>
<td>Explained</td>
<td>-0.0267*</td>
</tr>
<tr>
<td></td>
<td>(0.01390)</td>
<td>(0.01380)</td>
<td></td>
</tr>
<tr>
<td>Unexplained</td>
<td>0.0700***</td>
<td>Unexplained</td>
<td>0.122***</td>
</tr>
<tr>
<td></td>
<td>(0.01710)</td>
<td>(0.01450)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>3622</td>
<td>N</td>
<td>3622</td>
</tr>
</tbody>
</table>

Source: Analyzed from Commuter Survey 2019

Jurnal Ekonomi Kependudukan dan Keluarga
Another interesting finding from comparing the table above is that the marginal impact of travel time on wages is bigger for women than for men in OLS and Heckman approaches. Under the latter two methods, an additional minute of commute time is associated with a wage that is 0.01% higher for men and 0.2% higher for women.

In this estimation, we provide the Heckman selection model to address the issue of selection bias. To some extent, women tend to have less likelihood to be dropped out of our sample due to some factors. The estimation presents that education, age, household size, being a household head, and kid presence significantly influence people to be our observation. A number of household sizes and her status being household head tend to decrease the probability of a woman participating in the labor market. Moreover, education, age, and having children tend to increase their probability in the labor market.

**Blinder-Oaxaca Decomposition**

The decomposition of the wage gap given by Equation (6) is shown in Table 3 highlighting the explained and unexplained portions related to commute time. As it can be seen from the table, the total gap is 3% under both OLS but increase significantly to 11% when participation is controlled using Heckman. According to the previous studies, the explained percentage was negative, which is consistent with the higher average human capital of women workers. The unexplained fraction, however, equals or exceeds the explained portion by a factor of 7% to 12% approximately.

Regarding commute time, the coefficient accounts for about 0.4% of the log wage gap difference using OLS or Heckman. As for the unexplained portion, the commute time coefficient represents 2% of the log wage difference under OLS and 1% under Heckman insignificantly affect different wage among male and female commuters.

**Discussion**

The Oaxaca-Blinder decomposition was used to analyze the gender pay gap in the Jakarta Metropolitan Area, Indonesia. Special emphasis was given to the inclusion of commute time as a key factor in determining both the explained and unexplained portions of the gap. Two different methods namely ordinary least squares and the Heckman selection model were used to estimate the coefficients of the pay equations for men and women under the decomposition technique.

According to the estimates, the gap ranged between 3% and 11%. A positive gap means that women’s average wages are lower than men’s average wages. This result is in line with previous studies in Indonesia. Paramayudha research (2023) found that there was a wage gap between genders of 33.6%. Sukma and Kadir found a slightly smaller wage gap between genders ranging from 30% to 20%. Both studies used National Employment Survey data.

Depending on the estimating method, the unexplained part, regarded as a measure of unobservable factor against women, ranged from 2% to 3% while the explained portion which measures the endowment factor lies between 7% to 12%. The larger unobservable gap is a strong indication of discrimination against women in the labor market. Similar results are also found by other studies which show that discrimination is the main cause of the wage gap between genders. Research conducted by Lusiyanti (2020) found that the magnitude of the wage gap between genders that occurred in Indonesia in 2019 due to endowment factors (age, working hours, education, and type and employment) was only around 3.53% of the total wage gap. While the contribution of unexplained factors (discrimination) amounted to 96.45%.

Women’s discrimination in the labor market can be caused by at least two things, namely the existence of a patriarchal culture (the mindset that women’s duties only take care of the household makes parents put aside the education of girls compared to boys) and the negative prejudice that women have lower productivity levels due to their absence during childbirth and so on (Ozcan et al., 2003).

However, the gender pay gap in the labor market is not always caused by discrimination by employers. Other explanations suggest that psychological attributes also contribute to the gender pay gap, such as attitudes towards risk, competition, and negotiation (Bertrand, 2011) however, these factors can only explain a small part of the gender pay gap (Blau and Kahn, 2017; Bertrand, 2018).

Differences in preferences between men and women in choosing the type of work also affect the wage gap. Women’s responsibilities in the household make them prefer jobs that have shorter working hours, more flexibility, more comfortable working conditions, and less risk (Anker, 1997). Filier’s (1985) theory of compensating wage differentials also states that each job has a different level of comfort, and each worker has different preferences about comfort. Women tend to choose jobs that are more
comfortable even though the wages received are lower. Meanwhile, men tend to choose jobs with higher wages despite less comfortable working conditions. This will also result in wage differences between male and female workers.

Goldin (2014) believes that true equality cannot be achieved by strengthening men’s and women’s bargaining skills or their willingness to compete. Rather, the gap can be reduced or eliminated through labor market changes, especially changes that increase the flexibility of working hours or reduce the disproportionate compensation for working long or specific hours.

According to equation (6), the gender wage gap is the sum of differences in the characteristics of men and women (explained) and factors that may indicate discrimination (unexplained). An interesting result is that the gender wage gap caused by human resource characteristics shows a negative value so it can be interpreted that women have better human resource characteristics compared to men. According to this study, the characteristics in question are education and experience.

Commute time accounted for 0.4% of the difference in the logarithm of wage income explained by worker characteristics; the remainder, ranging from 1% to 2%, was not explained by worker characteristics. The positive commute time estimation result explained means that women have a lower average commute time compared to men. It is likely that women have higher commuting costs, according to Roberts et al (2011), women face disutility in the form of psychological health due to longer commutes. In addition, this may also be related to household responsibilities that burden women more than men.

In the unexplained gender wage gap section, travel time is negative, which means that women have a higher travel coefficient than men. Women may be able to earn higher wages if they can travel longer. The wage gap between genders can be minimized by providing more opportunities for women to travel longer (Paramayudha, 2023).

If a large part of the gender pay gap is due to women’s willingness to be paid less to compensate for shorter commutes, then to address or reduce the gender pay gap, efforts need to be made to address the reasons why women make these decisions. One reason may be the responsibility to combine work and family, as it is women who do most of the childcare as well as the care of parents or elderly relatives (Nafilyan, 2019).

Traditional strategies have concentrated on features of the job, ignoring the disparities between men’s and women’s preference of commuting and the complex considerations involved in the choice of a household’s place to live. To better identify and understand the elements influencing the differences in work decisions between men and women, additional study is therefore required for the development and evaluation of gender equality policies related to location and commute times.

There is empirical evidence that there are differences in commute patterns between men and women. Kwon & Akar (2021) found that women have shorter travel distances than men and the travel gap increases when households have children aged 6 to 15 years. Hanson & Pratt (1996) also argue that women’s responsibilities in the household limit women’s choice of employment, so women lose the opportunity to obtain higher-paying jobs. In addition, women also feel a greater impact in the form of loss of psychological health due to longer commutes (Roberts et al., 2011).

In contrast, equation (6) shows that shorter travel times for both men and women would have little (or no) impact on the explained wage gap (first term on the right side) and would decrease the unexplained gap (second term on the right side), because, according to our estimates in Table 2, commuting time would be positive when residential location is instrumented.

However, a quick assessment can be done using our estimate of equation (6). Assume that the average woman wage increased to the average level then the explained proportion (X_i^M-X_i^F) of commute time would drop. Additionally, since the man coefficient for commuting time is negative, our estimate of equation (6) predicts that the explained gap (X_i^M-X_i^F) for that group would be greater as the unexplained portion (i^M- i^F) decreased.

Furthermore, since the coefficient difference between men and women is positive, the unexplained gap would also increase as the average woman’s salary increased. In the case of the Indonesia labor market, the low level of women’s participation in addition to the patriarchal culture can also be caused by discrimination after they enter the labor market (Lusiyanti, 2020). Discrimination in this case is related to income earned. Differences in income or access to certain jobs for two people with the same productivity but treated differently is discrimination (Jacobson, 1994).
Interpretation of the wage decomposition results may suggest that the overall gender wage gap could be minimized by increasing women's commuting time. Given the explanations of Roberts et al. (2011) and Hanson & Pratt (1996), this could be done by reducing the cost of travel that women perceive to be greater due to stress or household responsibilities.

Conclusions

The present study aims to contribute to the gender wage gap literature by including commute time in the wage equations. This was made possible for the Jakarta Metropolitan Area due to the survey for commuting conducted by the Badan Pusat Statistik Indonesia in 2019. The results using two different methods namely OLS and Heckman selection method to confirm that the gender wage gap occurs in the Jakarta Metropolitan Area. Depending on the method used, the gap ranged from 3% to 11%.

The contribution of endowment factors and discrimination factors to the wage gap between genders ranged from 2% to 3% and 7% to 12%, respectively. This shows that the contribution of the unexplained factor to the income gap between genders is greater than the endowment factor. Commuting time accounted for 13% to 17% of the difference which can explained by worker characteristics while 8% to 31% was not explained by worker characteristics.

In terms of the effect of commute time on wage, our estimates show that commute time have a positive relationship under OLS and Heckman selection method.

It is important to keep in mind that household-specific effects, even in wage equations that do not account for commute time, might be a source of bias. Nevertheless, all two methods showed that commute time accounts for a significant part of the wage gap, whether it be explained by worker characteristics or unexplained attributes.

The addition of commute time from our study added a novel perspective to the variables taken into account when creating public policies in the Jakarta Metropolitan Area, Indonesia that attempt to reduce the gender wage gap. However, it is necessary to consider how work decisions and residential preferences would be influenced in order to determine the impact of public policies that affect travel times, such as an improvement in infrastructure that cuts down on travel times.

Seeing the magnitude of the discrimination factor (unexplained) in the gender wage gap in Jabodetabek, it is necessary for the government to socialize or enforce regulations related to gender equality in the labor market in accordance with the mandate of UU No. 13 of 2003. Things like this should be considered by the government because wage discrimination cannot be seen from the few cases or reports received from workers alone. Rather, there must be intensive supervisory action to all companies, both private and public, in Jabodetabek.

This study has not included other variables that can provide a more detailed explanation of the wage gap between genders in the labor market such as the scale of the company/place of work, length of work/length of business, and so on. Further research is needed by including other variables and using time series data to see the trend of the gender wage gap.

Reference

Gutierrez, F. (2018). Commuting patterns, the spatial distribution of jobs and the gender pay gap in the US. Available at SSRN 3290650.


