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# Is There Any Discrimination Towards Young Women in Indonesia's Labor Market?

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ABSTRACT

Gender equality is one of the most important issue in the labor market. In this paper, we want to observe the level of gender equality in Indonesia's labor market. One of the ways to do this is to estimate the relationship between gender and salary. We obtained a sample size of 1404 white-collar Indonesian employees, which consists of several variables such as salary, gender, age, education level, university, experience, job role, managerial role and company size. We estimated the relationship using Ordinary Least Squares and Blinder-Oaxaca Decomposition, and conclude that in general, gender has no significant impact on salary after holding all other variables constant. However, when we subset the data set to only young workers, we found evidence of salary-based discrimination towards young women in Indonesia's labor market.

SARI PATI

*Keseteraan gender merupakan salah satu isu paling penting di pasar tenaga kerja. Penelitian ini mengobservasi tingkat kesetaraan gender di pasar tenaga kerja Indonesia. Salah satu cara untuk melakukan hal tersebut adalah mengestimasi hubungan antara gender dan gaji. Data dikumpulkan dari 1404 pekerja kerah putih yang berisi variabel-variabel seperti gaji, gender, umur, tingkat pendidikan, universitas, pengalaman kerja, deskripsi pekerjaan, peranan sebagai manajer dan ukuran perusahaan. Penelitian ini mengestimasi hubungan tersebut dengan Ordinary Least Squares dan Blinder-Oaxaca Decomposition, dan menyimpulkan bahwa secara umum, gender tidak memiliki dampak signifikan terhadap gaji, ceteris paribus. Namun, jika data yang digunakan dibatasi untuk hanya karyawan muda, ditemukan bukti adanya diskriminasi gaji terhadap wanita muda di pasar tenaga kerja Indonesia..*

## INTRODUCTION

Gender equality is an unsolved issue that is still heavily debated today. It is an issue that always comes up whenever there is a political debate, especially during presidential elections, for almost every country. It is also one of The United Nations' sustainable development goals, as they explained that it is a necessary foundation for a peaceful, prosperous, and sustainable world (United Nations, 2018). One of the targets, of course, is to give women the same right as men in a professional environment. However, there are still many cases where gender discrimination in the workplace is heard. We are interested in observing the *ceteris paribus* impact of gender on salary in Indonesia, and perhaps its interaction with other variables that can affect salary.

We will look at back at academic papers and researches that have deeply discussed gender equality, especially in the labor market. Several researchers argue that there is still gender discrimination in the workplace. However, there are also dissenting voices who argue that the gender pay-gap is not caused by discrimination, but by other factors. Most academics agree that gender discrimination in the workforce is more apparent in Asia than in Western countries. Based on these references, we plan to continue observing the gender pay-gap issue using Indonesia's labor market.

We consider using Ordinary Least Squares (OLS) to estimate the relationship between gender and salary. Furthermore, we also discussed how we were able to obtain a comprehensive data set, and how the data were measured, processed and cleaned. The data collecting process was assisted by EKRUT, a technology-based recruitment startup company in Indonesia.

We first used descriptive analysis to look into our data set deeper, especially the salary variable. We found that on average, men tend to earn higher salary than women. Then, we estimate the relationship between gender and salary using OLS. We also included several other variables such as age, experience, education, company size, job role (engineering or non-engineering), university and managerial role. After adjusting for heteroscedasticity, we found gender to have no significant impact on salary, after holding all other variables constant. However, for workers who are younger than 30 years old, we found gender to be a significant predictor for age, as young (younger than 30 years old) women are estimated to earn 27% lower salary than young men, *ceteris paribus*.

We discussed how the Indonesian government has to respond based on our findings. We conclude that in general, a person's gender has no significant impact on their salary in Indonesia, holding all other variables constant. We also found age, education, university, company size, managerial role and job type to be significant predictors of salary. As a worker goes older, they are expected to earn higher salary. This relationship between age and salary is affected by gender, as we conclude that for workers who are younger than 30 years old, women tend to earn 27% less salary than men, after holding all other variables constant. Thus, gender can have a significant impact on salary for young workers, but not for older ones. Finally, we discussed the limitation of this paper, as we have not taken several variables into account, one of them being the employer's industry.

### Literature Review

Gender equality refers to the idea that men and women have the same rights and obligations. It is achieved when women and men enjoy the same rights and opportunities, while their values and needs are equally valued (Gender Equality in Ireland, 2017). As simple as that sounds, achieving gender equality in all sectors is far from being realized due to several reasons, such as cultural, behavioral and religious reasons. As an example, women in Slovakia are offered fewer opportunities for self-realization compared to men (Hussam, Debnarova, Musova, & Kristovik, 2017). In addition, Schnabel

(2016) found that there is significant difference in gender equality indices between religious and non-religious countries. Furthermore, those who fight for gender equality, such as feminist movements, may have been ineffective as non-governmental women organizations tend to have different feminist agendas (Phillips, 2015). For example, Irish Aid provides treatment for gender equality and gender mainstreaming. However, Reilly (2013) found that gender equality has low salience in Irish Aid and a record of weak implementation as the link between officials and women's movement is weak. In the health sector, the application of gender equality policies is limited by lack of deep knowledge and gender expertise (Payne & Bennett, 2015). Another case of ineffective policy can be seen from Japan, as their policy has always struggled against traditional values and fiscal rectitude (Osawa, 2005). Nioa (2002) also found that women have only achieved two-thirds of what is needed to have equality with men. Furthermore, in Nordic countries, Siim (2013) found that there is a negative relationship between race diversity and gender equality, which makes it difficult to tackle both race diversity and gender equality issues at the same time.

Why is gender equality important? According to Repo (2012), gender equality is an important variable that can have a causal impact on optimal fertility in Europe and Japan, which in turn affect their economic growth. Lagerlof (2003) offers a more detailed explanation of this relationship, as he found that as gender equality increases, women's time become more expensive which in turn decrease fertility. This decrease in fertility means a more quality-over-quantity approach in raising children, which in the long-run increases income per capita, hence economic growth. However, Neyer, Lappegard, & Vignoli (2013) argued the relationship between gender equality and fertility is still inconclusive, and more attention to gender equality is needed. Furthermore, gender gap in violent crimes is narrower in more gender-equal neighborhoods as men's crime rate become lower and closer to women's (Lei, Simons, Simons, & Edmond, 2014). The research done by Wemlinger & Berlan (2015) also found that in countries with high gender-equality level, women increase their volunteering activities in traditional female organization. Finally, more research in gender equality is still needed for the insurance industry, as the balance and relationship between gender equality and insurance is still a complex issue to solve (Torella, 2011).

How do we measure gender equality? On a personal level, men and women tend to see the current level of gender equality differently (Sorlin, Lindholm, Ng, & Ohman, 2011), as men rate progress towards gender equality higher than women do (Eibach & Ehrlinger, 2010). In this research, we are interested in the issue within a higher level. One way to measure a country's gender equality index is by observing its labor market. According to Ertan (2016), we can measure gender equality based on six components: reconciliation, blueprint, employment, quotas, violence against women and family law. In this case, we want to focus on the third component, which is gender equality in the labor market. One of the reasons why it is important to observe gender equality in a workplace is because gender equality at the workplace can improve mental health for women (Elwer, Harryson, Bolin, & Hammarstrom, 2013). Furthermore, there are actionable potential solutions to this problem, including promoting gender mainstreaming (Velluti, 2008).

Income inequality is an issue that is still difficult to solve, even by labor law regulations (Calderon & Chang, 2009). In this paper, we want to observe whether men are earning more than women by comparing their salary. The reason why we are interested in this particular issue is because it is an issue that is often brought even outside the world of academia. In Australia, policies supporting women appear to be ineffective in narrowing the gender pay gap (Chang, Connell, Burgess, & Travaglione, 2014). According to Barbezat & Hughes (2005), men in academia earn 20.7% more than men, and they argue that 17% point of the gap is due to discrimination. Note that gender discrimination issue in the labor market is not only in the difference between their salary level. In Rwanda, 39% of women have reported cases of discrimination based on pregnancy, maternity and family responsibilities (Newman, de Vries, Kanazuke, & Ngendahimana, 2011). The effect of the gender pay gap discrimination can also cause a discrimination in job evaluation, as there tends to be a positive bias in job evaluation for those with higher salary (Rutt & Doverspike, 1999). With this issue in mind, Oaxaca & Ransom (2003) proposed using econometric models to make salary adjustments that can combat the gender pay gap, but of course this issue is far from being resolved, especially around the world.

However, the income gap between gender may not necessarily be caused by discrimination. For example, Chalikia & Hinsz (2013) found that once we take other variables into account, they no longer found statistical difference in salary between male and female faculty members. Also, the female labor participation rate and hence perhaps their average salary are affected by factors such as structural change, education and fertility dynamics, although these relationships have little empirical support (Gaddis & Klasen, 2014). Furthermore, a person's personality may be an important factor for determining their salary, as besides a person's openness, Spurk & Abele (2011) found that conscientiousness, extraversion, agreeableness and neuroticism have significant impact on salary. This relates to the research done by O'Shea & Bush (2002), who found that gender has nothing to do with their likelihood of negotiating a higher salary, so perhaps gender is not the significant factor of determining starting salary. In contrast, Heckert, Droste, Adams, Griffin, Roberts, Mueller, & Wallis (2002) found that women expected significantly lower salary level than men.

The general attitude towards gender equality is different across different parts of the world, as there is a high degree of heterogeneity across countries in terms of gender equality, especially in the labor market (Abras, Hoyos, Narayan, & Tiwari, 2013). With the number of liberals growing in the US, the attitude towards gender equality in the West is becoming more positive, as liberals tend to have a more positive attitude towards gender equality (Chon, 2015). On the other hand, Asia's attitude toward gender equality is not as positive as its western counterparts. For example, in Japan, there are only few women who are in corporate management positions and congressional representatives (Ui & Matsui, 2008). Perhaps one of the reasons why women in Japan tend to focus on certain career paths is because Japanese high schools play a significant factor, sometimes too much, in choosing the careers of their students (Brinton, 2000).

In Asia, the condition of the labor market, like any other part of the culture, is more conservative in general then in the US. Child labor is still an issue that is happening in Asia, as Webbink, Smits, & Jong (2015) reported that demographic and cultural factors push some children in Asia to work 13 hours per week on average. Of course, Asia is improving in terms of economic development, but it takes a different type of capitalism compared to the West (Kwon, 2007). China's expansion in international trade has affected Asia's labor market (Rasiah, 2005), but this does not necessarily impact the cultural values of labor conditions in Asia. In fact, Huang & Huang (2013) found that by not imposing labor market adjustments, the four Asian tigers (Hong Kong, South Korea, Singapore and Taiwan) were able to increase their competitiveness while lowering their labor conditions. There are several countries in Asia that have revised their labor laws to improve labor conditions, but the distance between law and practice is wide, as what is happening in reality is difficult to govern by laws (Caraway, 2009). The most significant improvement in Asia's labor standards mostly come from international influences, but overall it has little effect on the overall labor standards (Caraway, 2010).

Besides gender, there are of course other variables that can possibly affect a person's salary. Based on a well-known research by Mincer (1958), we know that there is a benefit in investing in human capital in terms of earnings. More specifically, we expect education and work experience be determinant of earnings, as suggested by Mincer (1974). In addition, another variable that is likely to be a significant factor is seniority. As an example, Yeh & Wang (2012) found that in research-oriented faculties, seniority tend to have a significant impact on salary, after holding rank and discipline constant. This relationship seems to be stronger in Asia, as they have traditionally adapted respecting the elderly as part of their culture. Based on the research done by Lowe, Milliman, De Cieri, & Dowling (2002), seniority is an important factor in determining work compensations for South Korea and China. This is more prevalent in Japanese companies as they tend to formally adept seniority-based pay system (Wan, 2006). In contrast, for Western countries, increases in salary and compensations due to seniority are mostly used to avoid public conflict by public-sector organizations, as they focus more on performance-based compensations. (Fischer, 2008). The difference in attitude towards seniority-based compensations is an interesting topic itself, but the general consensus seems to be against the idea. According to McCampbell, Jongpipitporn, Umar, & Ungaree (1999), employees in Thailand prefer to change their remuneration system from seniority-based to merit-based, as they realize the latter would lead them to be able to compete with their Western counterparts.

More importantly, this research focuses on gender equality in Asia's labor market. Since we were able to obtain significant amount of data in Indonesia's labor market, we decided to use Indonesia as an example of how the Asian labor market treats gender equality today. A research regarding gender pay-gap in Indonesia was done by Taniguchi & Tuwo (2014), using the 2010 National Labor Force Survey (SAKERNAS) data. In their research, they found that there is gender pay-gap phenomenon does exist in Indonesia, and more importantly they found gender discrimination to be the cause. Furthermore, they found that the salary gap between gender is higher towards young workers.

As for our research, we decided to use a different source for our data set. We managed to obtain 1404 observations which include several variables such as salary, work experience, gender, education, occupation and age from EKRUT (2017), where all data are obtained in 2017.

## METHODS

### Ordinary Least Squares

One way to estimate the relationship between a person's gender and his/her salary is to use Ordinary Least Squares (OLS). Consider the following equation;

$$salary_i = \beta_0 + \beta_1 female_i + u_i \qquad (1)$$

where $\boldsymbol{salary_i}$ represents the monthly salary of person $\boldsymbol{i}$; $\boldsymbol{female_i}$ represents a dummy variable that takes a value of 1 if person $\boldsymbol{i}$ is female and takes a value of 0 otherwise; and $\boldsymbol{u_i}$ represents any unobserved variables that can affect salary. If we expect that there is gender inequality in Indonesia's labor market, then we expect the value of $\beta_1$ to be lower than 0, which shows that women on average earn less than men.

However, there are reasons to argue that the dummy variable $\boldsymbol{female_i}$ is endogenous in equation (1). For example, there are roles that are mostly populated by either men (such as computer engineering) or women (design). This means that there can be a positive correlation between being male and having an engineering role. If there is a significant difference in salary between engineering and non-engineering roles, then job role is a significant predictor of salary that is in the error term of (1). Therefore, it is reasonable to argue that there is a correlation between the variable $\boldsymbol{female_i}$ and the error term in equation (1).

$$corr(female_i, u_i) \neq 0$$

If this is the case, then $\boldsymbol{female_i}$ is an endogenous regressor in equation (1) and the estimated parameter $\hat{\beta}_1$ is biased and inconsistent. Thus, we need to take other factors that can affect salary and can be correlated with gender into account. Consider the following equation;

$$salary_i = \beta_0 + \beta_1 female_i + \boldsymbol{X}\beta + u_i \qquad (2)$$

where $\boldsymbol{X}$ represents a matrix of other observed variables that can affect salary. The variables that are included in the matrix, together with their descriptions, are explained in section 2.

There are other methods that can be used to estimate model (2) other than OLS, but it is reasonable to argue that the OLS estimator will have the lowest variance compared to other models (more "complicated" models), due to the comprehensiveness and availability of our cross-section data set. Perhaps fixed effect or random effect estimators can improve the model, but we do not have a panel data set available at this point. It is important to not overfit the estimation, especially for inference purposes, so the OLS estimator is our method of choice.

**Blinder-Oaxaca Decomposition**

Another way to observe gender pay-gap is to use the Blinder-Oaxaca Decomposition. This method was made and used by Blinder (1973) and Oaxaca (1973) as a way to separate the explained and unexplained variation in the difference between the average salary of each group. This method can be used not only for cases such as gender pay-gap, but also race pay-gap.

**Data Collection and Description**

The data set is obtained from EKRUT (2017), a tech-based headhunting startup company in Indonesia. We observed 1404 employed white-collar workers, whose data were obtained either via phone call or by the EKRUT platform (website). All data were taken in 2017. Note that from this point on, all mentions of "workers" refer to white-collar workers only.

The EKRUT database focuses on white-collar workers, and the data is obtained directly from respondents. The reason why the EKRUT database can give a different perspective compared to the National Labor Force Survey is because the respondents have an incentive to give accurate information, especially regarding their salary, because they are giving this information so that they can get a job offer that best fit them. EKRUT explicitly tells the customers that they are more likely to get an offer that fits them the most by providing accurate information, as they always filter and curate respondents whose data are considered invalid. EKRUT also has an algorithm that automatically finds data that are considered invalid or outliers.

The variable that we use as the dependent variable, salary, is measured in Rupiah. The problem with getting salary data is that the accuracy is sometimes questionable. Salary is a "sensitive" variable, and so some people tend to oversell their own salary, causing a positive bias in our data. In order to combat this inaccuracy, instead of asking for a number, we ask for a range of their monthly salary. In other words, we ask for the minimum amount of salary they get in a month and their maximum amount. Asking for a range is not only more applicable for some respondents, it can also reduce the bias coming from overselling salary. There are also respondents who give the same minimum and maximum salary value, which likely means that they get consistent salary every month. Once we get the minimum and maximum value, we clean and/or remove extreme and invalid values. If either the minimum or maximum value is empty, then we assume the respondent has the same minimum and maximum salary. Once the salary data are clean, we calculate the mean salary of each person and transform its distribution by using a ln function, as the salary distribution is closer to a natural log distribution.

The main independent variable, gender, is measured as a dummy variable "female", which takes the value of 1 if the respondent is female and 0 otherwise. The accuracy of the gender variable is not questionable, and there were no missing or invalid values in the variable.

There are other variables that we decided to include in our estimations. First, we observe the respondent's age, measured in years. We also measured a person's working experience, also measured in years. We expect salary to increase, on average, as age and experience increase. Next, we measured a person's highest education as a categorical variable, so we decided to turn this into two dummy variables: "bachelor" which takes the value of 1 if the person's highest obtained degree is a bachelor's degree, 0 otherwise; and "master" which takes the value of 1 if the person's highest obtained degree is a master's degree, 0 otherwise. Unfortunately, we did not have any respondents with a doctoral degree, so we did not create a dummy variable for doctoral. We also created the dummy variable "international", which takes the value of 1 if the person is an overseas university graduate, 0 otherwise. The reason why we include these education variables is because we expect getting a higher education and being an overseas graduate will have a positive impact on salary.

Furthermore, we went deeper into a person's work experience. We included a dummy variable named "manager", which takes the value of 1 if the person is in a managerial position (i.e. having direct dependents in their workplace), 0 otherwise. We expect managers to earn more, on average, than non-managers. We also included the dummy variable "mnc", which takes the value of 1 if the respondent is working in a listed multinational company, 0 otherwise. In this case, while we generally expect those who work in a listed multinational company to earn more, we are seeing several high-earners in startup companies. Finally, we decided to include a dummy variable "engineering" which takes the value is 1 if the person is working as a software engineer (which includes backend engineers, frontend engineers, full stack engineers, build-release engineers, develops engineers, UX engineers, machine learning engineers, data engineers, database administrators, mobile engineers, test engineers, security engineers and engineering managers) and takes the value 0 otherwise. We have no expectations whether engineers earn more or less than other roles in Indonesia, but our main concern will be the impact of the interaction between gender and having an engineering role on salary.

## RESULTS AND DISCUSSION

### Preliminary Analysis

Table 1 represents the descriptive statistics of our variables.

We can see from Table 4.1 that the average monthly salary of our data is roughly Rp. 14,500,000.00. The maximum salary obtained is Rp. 104,000,000.00 per month, and the minimum salary is Rp. 1,000,000.00 per month. These numbers are reasonable, as we have removed missing and invalid values. On the other hand, we can see that only 19% of our sample size is female. This is because in Indonesia, most workers are men. The minimum

Tabel 1. Descriptive Statistics

| | SALARY | FEMALE | AGE | BACHELOR | MASTER | ENGINEERING | EXPERIENCE LENGTH | INTERNATIONAL | MANAGER | MNC |
|---|---|---|---|---|---|---|---|---|---|---|
| Mean | 14489263 | 0.193133 | 28.72031 | 0.801860 | 0.115880 | 0.486409 | 7.175250 | 0.062232 | 0.286123 | 0.153076 |
| Median | 12000000 | 0.000000 | 28.00000 | 1.000000 | 0.000000 | 0.000000 | 6.000000 | 0.000000 | 0.000000 | 0.000000 |
| Maximum | 1.04E+08 | 1.000000 | 47.00000 | 1.000000 | 1.000000 | 1.000000 | 27.00000 | 1.000000 | 1.000000 | 1.000000 |
| Minimum | 1000000. | 0.000000 | 19.00000 | 0.000000 | 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.000000 | 0.000000 |
| Std. Dev. | 10795571 | 0.394898 | 4.909317 | 0.398741 | 0.320195 | 0.499994 | 4.244839 | 0.241662 | 0.452109 | 0.360189 |

and maximum value of the variable "female" is 0 and 1 respectively, which makes sense since this is a dummy variable. As for the other variables, we can see that the average age is 29 years old, 80% of our respondents have at least a bachelor degree, 12% of our respondents have a master's degree, 49% of the respondents are working in an engineering role, the average working experience is 7 years, 7% of the respondents are overseas graduate, 29% of our respondents are managers and 15% of our respondents work in a multi-national company.

The main issue that we are interested in is the relationship between salary and gender. Since the salary distribution is far from normal, we take the natural logarithmic value of salary to reduce the dispersion. Figure 1 shows the general relationship between salary and gender. Note that although there are still several dots outside of the whiskers, we decided to include them as they represent high earners, but not necessarily outliers given their level, occupation and the company they work for.

We plot gender on the x-axis and ln(salary) on the y-axis. The "F" value in gender represents female, while the "M" value represents male. We can see that on average, men tend to earn more than women. This means that the correlation between being male and salary is likely to be positive. There are some outliers in the data set, so we decided to remove some of them (but not all of them, since there are several high earners who represent correct data).

Next, consider the following equation;

$$\ln(salary_i) = \beta_0 + \beta_1 female_i + u_i \quad (3)$$

where $\ln(salary_i)$ the natural logarithmic salary value of respondent $i$; $female_i$ is a dummy variable that takes a value of 1 if respondent $i$ is female and 0 otherwise; and $u_i$ is any other unobserved variables that can affect salary. We estimate equation (3) using OLS in R, and the resulting parameter estimates and their t-statistics are summarized in table 2.

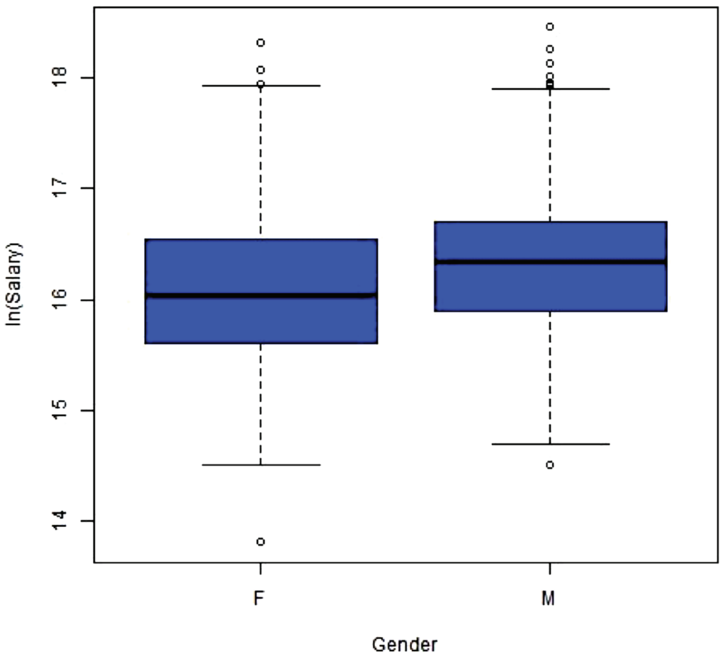


Figure 1. Boxplot of Gender and Salary

Tabel 2. OLS Estimation of ln(Salary) by Gender

| Estimation | Model (3) |
|---|---|
| Constant | 16.3169<br>(858.3015)*** |
| Female | -0.2164<br>(-4.9999)*** |
| F Statistics | 24.9990*** |
| $R^2$ | 0.0175 |
| Observations | 1404 |

*** = significant at 1%

Based on Table 2, we can see that women are expected to earn less, on average, by 21.64% compared to men. We can also see from Table 2 that gender has a significant impact on salary, at 1% level of significance. However, as mentioned in Section 3, it is reasonable to argue that the estimated parameter $\widehat{\beta}_2$ is inconsistent and biased in equation (3), as gender is likely to be correlated with variables in the error term. Thus, we will include other variables in the model in the next section.

**Impact of Gender on Salary**

We expect the variable ***female$_i$*** to be endogenous in equation (3), so we decided to take other variables that can affect salary into account. Consider the following equation;

$$\ln(salary_i) = \beta_0 + \beta_1 female_i + \beta_2 age_i + \beta_3 age^2_i + \beta_4 bachelor_i + \beta_5 master_i + \beta_6 engineering_i + \beta_7 exeriencelength_i + \beta_8 international_i + \beta_9 manager + \beta_{10} mnc_i + u_i \quad (4)$$

where *salary$_i$* represents the monthly salary of respondent *i*; ***female$_i$*** is a dummy variable that takes the value of 1 if respondent ***i*** is female, 0 otherwise; ***age$_i$*** represents the age of respondent *i*, measured in years; ***bachelor$_i$*** is a dummy variable that takes the value of 1 if the highest education of respondent ***i*** is a bachelor degree, 0 otherwise; ***master$_i$*** is a dummy variable that takes the value of 1 if the highest education of respondent ***i*** is a master's degree, 0 otherwise; ***engineering$_i$*** is a dummy variable that takes the value of 1 if respondent ***i*** works in a software engineering role, 0 otherwise; ***experiencelength$_i$*** represents the working experience length of respondent ***i***, measured in years; ***international$_i$*** is a dummy variable that takes the value of 1 if respondent ***i*** is an overseas (outside of Indonesia) graduate, 0 otherwise; ***manager$_i$*** is a dummy variable that takes the value of 1 if respondent ***i*** works in a managerial role (having subordinates), 0 otherwise; ***mnc$_i$*** is a dummy variable that takes the value of 1 if respondent ***i*** works in a multi-national company, 0 otherwise; and ***u$_i$*** represents any other unobserved variables that can affect salary. We estimate equation (4) using OLS, and the estimated parameters (and their t-statistics) are summarized in table 3.

Before we look at the parameter estimates and their significance, we did a White test to determine whether or not model (4) exhibits heteroskedasticity. Based on the White test statistics, we can conclude that there is heteroskedasticity in model (4), which means if we use the ordinary parameter standard errors, they will be inaccurate, and our tests will be invalid. So instead, we use White standard errors so that we take into account the presence of heteroskedasticity and our inferences will still be valid despite the presence of heteroskedasticity.

We can see from Table 3 that in model (4) (with White standard errors), the dummy variable ***female$_i$***, or gender, is not a significant predictor of salary, ceteris paribus. This contradicts our results from model (3) which concludes that gender is a significant predictor of salary. Thus, when we take other variables into account and hold them constant, there is no significant relationship between gender and salary. This is inconsistent with the results found by Taniguchi & Tuwo (2014).

Another interesting result comes from the lack of significance of the experience variable. We found age to be a significant predictor of salary, but their total working experience is not. To make

Tabel 3. The Level of Employees Work Stress

| | Model (4) – Ordinary Standard Errors | Model (4) – White Standard Errors |
|---|---|---|
| Constant | 11.7892<br>(32.2755)*** | 11.7892<br>(31.2419)*** |
| Female | -0.0507<br>(-1.4560) | -0.0507<br>(-1.3275) |
| Age | 0.2151<br>(9.1159)*** | 0.2151<br>(9.0199)*** |
| $Age^2$ | -0.0024<br>(-6.5116)*** | -0.0024<br>(-6.5497)*** |
| Bachelor | 0.1724<br>(3.7537)*** | 0.1724<br>(3.6445)*** |
| Master | 0.3279<br>(5.6266)*** | 0.3279<br>(5.4589)*** |
| Engineering | 0.1277<br>(4.4073)*** | 0.1277<br>(4.3107)*** |
| Experience Length | 0.0017<br>(0.5828) | 0.0017<br>(0.6166) |
| International | 0.2707<br>(5.0234)*** | 0.2707<br>(4.8461)*** |
| Manager | 0.3865<br>(12.0428)*** | 0.3865<br>(11.2814)*** |
| MNC | 0.0736<br>(2.0897)** | 0.0736<br>(2.1173)** |
| White Obs*$R^2$ | 90.7970*** | |
| F Statistics | 128.3092*** | 128.3092*** |
| $R^2$ | 0.4805 | 0.4805 |
| Observations | 1398 | 1398 |

** = significant at 5%, *** = significant at 1%

sure that this is not caused by the presence of multicollinearity, we calculate the Variance Inflation Factor (VIF) of each variable in model (4) and summarized the output in table 4.

We can see from Table 4 that none of the variables has a VIF value that is above 10. Thus, we can conclude the model does not suffer from multicollinearity, and therefore we can use model (4) to test the significance of the variables and interpret the estimated parameters.

From Table 3, we can see that both $age_i$ and $age^2_i$ are significant predictors of salary. This means that on average, salary tends to increase as a person gets older, but the increase gets lower after a certain point. More specifically, on average the positive impact of age on salary decreases after hitting 45 years old. In contrast, we found the variable experience to not be a significant predictor of salary. This shows that in Indonesia, a person's age has more impact on the amount of monthly salary than their experience. Perhaps some experienced younger talents are still willing to learn despite a getting a low salary, and they are more willing take risks. On the other hand, older workers value stability and they are likely to prefer a stable job with higher pay.

Tabel 4. Variance Inflation Factor of Model (4)

| Variable | VIF |
|---|---|
| Constant | 0.1424 |
| Female | 0.0015 |
| Age | 0.0006 |
| $Age^2$ | 0.0000 |
| Bachelor | 0.0022 |
| Master | 0.0036 |
| Engineering | 0.0009 |
| Experience Length | 0.0000 |
| International | 0.0031 |
| Manager | 0.0012 |
| MNC | 0.0012 |

We can also see from Table 3 that higher education has an impact on a person's salary. A worker with a bachelor degree on average gets 17.24% higher salary than those without a bachelor degree, ceteris paribus. Furthermore, those who possess a master's degree on average gets 32.79% higher salary than those that do not at least possess a bachelor degree, ceteris paribus. Being an overseas university graduate also leads to higher salary, as our estimations suggest that overseas university graduate on average earn 27.07% more than those who are not.

Next, we observe the parameter estimate of the "engineering" dummy. This shows that on average, software engineers earn 12.77% more than non-engineers, ceteris paribus. We also found that those who are in a managerial role on average earn 38.65% more than non-managers, ceteris paribus. Finally, we found that workers who work at a Multi-National Company earn 7.36% more than those who do not, ceteris paribus. Except for experience and gender, all other variables are found to be statistically significant predictors of salary, at least at 5% level of significance.

Thus, in general, when we hold other variables constant, we conclude that a person's gender has no significant impact on a person's salary. So, based on the box plot above (Figure 1), how come men tend to earn more than women? In order to answer this question, we decided to observe this relationship in certain subsets, using dummy variables. The first thing we want to see is whether female engineers earn significantly less than male engineers.

**Impact of The Interaction of Gender with Engineering Role on Salary**

The next thing we are interested in whether or not there is gender inequality in software engineering roles. Consider the following equation;

$$\text{In}(salary_i) = \beta_0 + \beta_1 female_i + \beta_2 age_i + \beta_3 age^2_i + \beta_4 bachelor_i + \beta_5 master_i + \beta_6 engineering_i + \beta_7 exeriencelength_i + \beta_8 international_i + \beta_9 manager + \beta_{10} mnc_i + \beta_{11}(female_i \text{ x } engineering_i) + u_i \quad (5)$$

where the interaction variable *($female_i$ x $engineering_i$)* is used to capture the extra impact of being a female software engineer on salary. We estimate equation (5) using OLS with White standard errors and obtain the following see table 5.

We can see from Table5 that both the variable ***$female_i$*** and the interaction variable *($female_i$ x $engineering_i$)*

Tabel 5. Variance Inflation Factor of Model (4)

| Estimation | Model (4.3) |
|---|---|
| Constant | 11.7861<br>(31.2349)*** |
| Female | -0.0546<br>(-1.2629) |
| Age | 0.2155<br>(9.0271)*** |
| $Age^2$ | -0.0025<br>(-6.5601)*** |
| Bachelor | 0.1725<br>(3.6460)*** |
| Master | 0.3280<br>(5.4594)*** |
| Engineering | 0.1254<br>(3.9598)*** |
| Experience Length | 0.0017<br>(0.6044) |
| International | 0.2707<br>(4.8460)*** |
| Manager | 0.3860<br>(11.2121)*** |
| MNC | 0.0733<br>(2.1044)** |
| Female * Engineering | 0.0263<br>(0.3389) |
| F Statistics | 116.5733*** |
| $R^2$ | 0.4806 |
| Observations | 1398 |

** = significant at 5%, *** = significant at 1%

are not statistically significant. This means, based on the estimates of model (5), we can conclude that gender does not significantly affect salary for both engineering and non-engineering roles, ceteris paribus.

Next, we also observed the interaction variables of $\boldsymbol{female_i}$ and variables such as highest education, being an overseas graduate, being a manager and working in a multi-national company separately. We found that none of the interaction variables are significant. However, we found that there is an interesting interaction effect between age, gender and salary. We will discuss this interaction effect in the next section.

**Impact of The Interaction of Gender and Age (Seniority) on Salary**

The next thing we are going to observe the interaction effects of age and gender on salary. Consider the following equation;

$$\begin{aligned} \text{In}(salary_i) = {} & \beta_0 + \beta_1 female_i + \beta_2 below30_i \\ & + \beta_3 above40_i + \beta_4 bachelor_i + \\ & \beta_5 master_i + \beta_6 engineering_i + \\ & \beta_7 exeriencelength_i + \beta_8 international_i \\ & + \beta_9 manager + \beta_{10} mnc_i + \\ & \beta_{11}(female_i \text{ x } below30_i) + \\ & \beta_{12}(female_i \text{ x } above40_i) + u_i \end{aligned} \tag{6}$$

where $\boldsymbol{below30_i}$ is a dummy variable that takes the value of 1 if person $\boldsymbol{i}$ is younger than 30 years old, 0 otherwise; and $\boldsymbol{above40_i}$ is a dummy variable that takes the value of 1 if person $\boldsymbol{i}$ is older than 40 years old, 0 otherwise. If both new variables take the value of 0, then person $\boldsymbol{i}$ is between 30 and 40 years old (inclusive). We estimate equation (6) using OLS with White standard errors to get the output shown in table 6.

We can see several interesting conclusions from Table 6. First, we can see that the dummy variable $\boldsymbol{female_i}$ is still statistically insignificant, which means that for 30 to 40-year-old workers, there is no significant difference between men and women. Next, we can conclude based on the age dummies that age is a significant predictor for men. The interesting results come from the interaction variables. We can see that the $\boldsymbol{(female_i \times above40_i)}$ interaction variable is statistically insignificant, which shows that there is no significant difference in salary between men and women who are older than 40 years old.

Tabel 6. Impact of Gender*Age Dummies on Salary

| Estimation | Model (6) |
|---|---|
| Constant | 16.0876<br>(252.5463)*** |
| Female | 0.0868<br>(1.1961) |
| Below 30 | -0.4082<br>(-12.8665)*** |
| Above 40 | 0.3526<br>(4.6715)*** |
| Bachelor | 0.2145<br>(4.1561)*** |
| Master | 0.3787<br>(5.8621)*** |
| Engineering | 0.1204<br>(3.8805)*** |
| Experience Length | 0.0035<br>(1.1518) |
| International | 0.2884<br>(4.9782)*** |
| Manager | 0.4552<br>(12.9292)*** |
| MNC | 0.1021<br>(2.6384)*** |
| Female * Below 30 | -0.2720<br>(-3.1937)*** |
| Female * Above 40 | -0.0416<br>(-0.2986) |
| F Statistics | 76.6199*** |
| $R^2$ | 0.3990 |
| Observations | 1398 |

** = significant at 5%, *** = significant at 1%

However, the interesting part is the fact that the interaction variable ***(female$_i$ x below30$_i$)*** is statistically significant at equation (6), at 1% level of significance. This means that according to model (6), women who are younger than 30 years old earn 27.2% less than men who are younger than 30 years old. So, although generally we see gender equality in Indonesian labor market, we have evidence of gender inequality for white-collar employees who are less than 30 years old. In other words, this perhaps show that women are disadvantaged in the labor market when they are younger, but these disadvantages diminish as they get older.

**Blinder-Oaxaca Decomposition**

Next, we want to test whether the difference in salary between young (below 30 years old) men and women are explained (through other observed variables) or unexplained. When the difference is unexplained, they are attributed to factors that are unobserved, and perhaps some of them can be said to be caused by gender discrimination. The following table shows the result of the Blinder-Oaxaca Decomposition run through a total of 903 young workers.

| | |
|---|---|
| Predicted ln(Salary) for Male | 16.0527 |
| Predicted ln(Salary) for Female | 15.7305 |
| Total Difference | 0.3222 |
| Explained Difference | 0.1936 |
| Unexplained Difference | 0.1286 |
| Unexplained Difference Percentage | 39.91% |

Thus, we can conclude that 39.91% of the salary-gap between young men and women in Indonesia cannot be explained by variables such as education and experience and perhaps, some of them are caused by the fact that there is gender discrimination towards young women. This number is much lower than the one found by Taniguchi & Tuwo (2014), but nonetheless we found that 39.91% is still a significant percentage. At the same time, we can also argue based on our data set that the level of discrimination towards women in Indonesia is not as bad as their results, or perhaps this shows that from 2010 to 2017, the attitude of Indonesia's labor market towards young women has at least improved.

**Discussion**

Based on the results, we can see that in general, after holding all other variables constant, a person's gender has no significant impact on his or her salary. These results show that in general, there is gender equality in Indonesia's labor market, at least in terms of their wages. This is an interesting result as we have only divided the job categories into engineering and non-engineering, but in general we can be optimistic about the attitude of Indonesia's white-collar labor market on gender equality. We can see that gender is not a significant predictor of salary for both engineering and non-engineering roles.

On the other hand, a person's age does have a significant positive impact on their wages. As we investigate the relationship deeper, we found that for employees who are younger than 30 years old, women significantly earn less salary than men. As they get older though, the pay-gap between men and women gets narrower. These relationships can be seen in figure 2.

We can see from Figure 2 that the slope for men (represented by a blue line) and women (represented by a red line) are visually different. Women seem to benefit more from an increase in age, as the red slope looks much steeper than the blue slope. We can also see that although we have more men in our data set, there is a significant number of women (represented by red dots) who are earning significantly lower than the rest of our samples. Thus, the fact that there is a gender pay-gap towards young workers but not overall means there is a difference between our findings and the findings of Taniguchi & Tuwo (2014). While we also found that there is a gender pay-gap among young workers, we found the overall difference between men and women's salary in Indonesia to be insignificant in 2017.

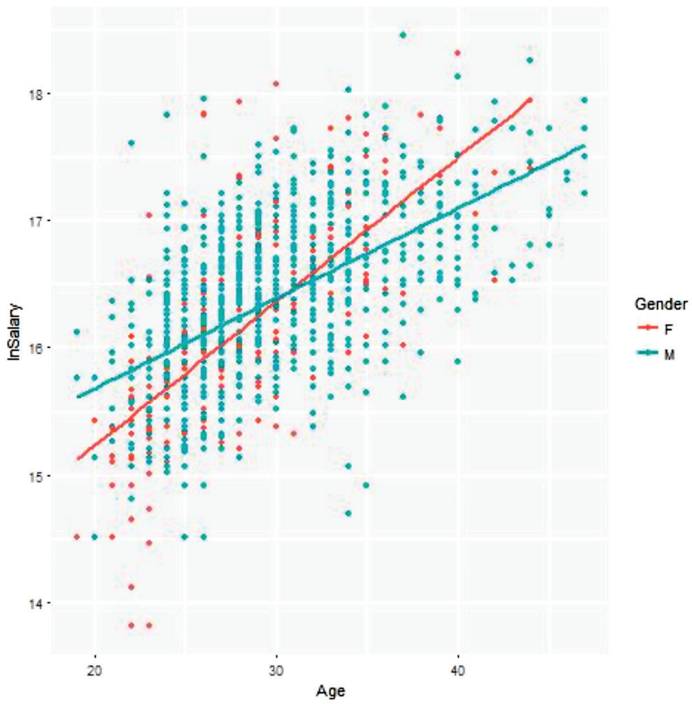


Figure 2. The relationship between age and salary, based on gender

Perhaps, we can argue based on Figure 4.2 and results from model (4.4) that perhaps there is discrimination against young women in the Indonesian labor market. This is not a surprising fact, as Indonesia, like other countries in Asia, have traditionally applied the idea that men are supposed to be above women in the workforce. At the same time, "respecting the elderly" and "seniority in the workforce" are also working cultures that are still heavily exist in the Indonesian labor force. Thus, as a woman gets older, she is less likely to face discrimination in the workforce as they can gain more respect based on their senior status.

There can also be another explanation to this phenomenon, in that perhaps this simply shows the difference in attitude towards gender equality for different generations. Similar to the rest of the world, Indonesia did not at first promote the idea of gender equality. In fact, the first known form of a significant gender equality movement was in 1912, where the first female-oriented school was born, named after Kartini, Indonesia's first gender equality activist (Biografiku, 2017). As of 2012 however, the opposite may even be true, as Indonesian boys are more likely to be outclassed by girls in both schools and universities, to a point where more than 50% of 15-year-old Indonesian boys (as opposed to approximately 40% of 15-year-old girls) are considered low-achievers in all subjects compared to the Organisation for Economic Co-operation (OECD) average (The Economist, 2015). Perhaps if we can separate the companies based on their culture (modern versus conservative), we can see a clearer pattern in a company's general attitude towards young women in Indonesia.

We also gained several other interesting insights from the results of our models. It can clearly be seen that education has a significant impact on salary. While we are not surprised that higher education leads to higher salary, it is interesting to see that on average, overseas graduates earn 29% higher salary than local graduates, ceteris paribus. This fact may show that perhaps Indonesia's local education is not on par compared to other countries. On the other hand, this increase in salary may have been contributed by other factors that are correlated with being an overseas graduate, such as other languages proficiency and level of confidence, especially if they graduate from western universities.

Furthermore, the fact that experience length is not a significant predictor of salary in Indonesia is an interesting fact on its own. We have checked the variable thoroughly and we found no outliers or errors in the variable, and all the values in the variable make sense. Perhaps there are still some variables that are omitted from our models, but at the same time, the fact that it is not significant may be caused by the stagnant mentality of some of the Indonesian employees. It is common for Indonesians to have only one job in his or her life, as unlike the western working culture, some Indonesian employees still consider job safety as top priority. A more thorough research is perhaps needed in observing the true relationship between a person's work experience length and their salary in Indonesia.

## MANAGERIAL IMPLICATION

By looking at the results, we would recommend the Indonesian government to pay more attention to the roadblocks young women face in Indonesia's labor market. Although of course there are high-achieving young women in Indonesia, our data and analysis show that they are significantly earning less than men who have the same classifications. We have also looked at how this relationship plays in engineering roles, but we found no difference in the impact of gender on salary for engineering and non-engineering roles. Thus, while job role does not seem to play a significant factor in the relationship, we found age to be a very significant predictor for both salary and the relationship between gender and salary.

So, continuing from the results of Taniguchi & Tuwo (2014) who used 2010 data, we found that based on the 2017 data, gender pay-gap among young workers still exist, although when we factor all ages gender is no longer a significant determinant of salary. This means that the government has not effectively done enough to combat this issue among young workers after seven years. We recommend policy makers to take this issue more seriously, as gender equality is one of the most important goals a country should strive for, and put more focus on tackling this issue among young workers.

## CONCLUSION

Based on our research, we can draw several conclusions. First, we found that in general, a person's gender does not have any significant impact on his or her salary. Although men tend to earn higher than women, once we take other factors into account, we no longer found the gender variable to be statistically significant. The second conclusion that we can draw, however, is that for workers who are younger than 30 years old, we found gender to be a significant predictor in salary. We observed the fact that on average, female workers who are less than 30 years old tend to earn 27.2% less salary than men who are less than 30 years old, ceteris paribus. Furthermore, we found that 39.91% of the difference in salary between young men and women is not explained by variables such as education and experience. This shows that perhaps, although there seems to be no salary-based discrimination towards older women in Indonesia, it is arguable that young women still suffer from cases of unfairness in Indonesian workplaces

We realize that there are limitations to our research. While the data set is comprehensive, we have not taken into account several other variables into account, such as language proficiency employer's business field (mining, technology etc.) and family variables such as number of children and age of children. Furthermore, for engineering roles, perhaps we have to take into account their proficiency of using certain operating systems, software applications and programming languages. As for our next research, we are likely to observe how likely it is for a person with certain characteristics gets a job, that is, we want to find out what kind of applicants are more likely to be accepted in Indonesia. ■

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