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An Analysis of Gender Wage Gap in Timor-Leste

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by

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Abstract

The gender wage gap, indicating the disparity in earnings between men and women, remains a pervasive issue worldwide, transcending both developed and developing nations, including Timor-Leste. Therefore, this study focuses on the gender wage gap in Timor-Leste. Utilizing data from the Timor-Leste Labor Force Survey for 2021, this research employs multiple linear regression to assess the factors influencing the wages of working-aged men and women. The Blinder-Oaxaca decomposition method is applied to identify factors contributing to the gender wage gap, distinguishing between explained and unexplained factors. The results show that living in urban areas, having advanced and intermediate education levels, working in the formal sector, having a permanent contract, and working full-time significantly affect wages. There is a disparity in wages, with men earning an average of 2.79 percent more than women. Explained factors contribute to an 8.6 percent reduction in the gender wage gap, highlighting the role of variables such as urban living, advanced education, and formal sector employment. However, unexplained factors exacerbate the gap by 11.39 percent, emphasizing the possibility of gender-based discrimination.

Keywords: gender wage gap, Timor-Leste, Blinder-Oaxaca decomposition.

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Chapter 1. Introduction

Background

Gender inequality remains an enduring and concerning issue worldwide, impacting both developed and developing nations. Notably, in developing countries like Timor-Leste, gender inequality remains a pronounced issue owing to persistent discrimination against women. In the effort to address this challenge, the government is actively engaged in implementing a diverse array of programs aimed at realizing the fifth Sustainable Development Goal (SDG): achieving gender equality and empowering all women and girls. A crucial aim within the domain of gender equality is the elimination of all manifestations of discrimination against women. This entails guaranteeing that women enjoy complete and impactful participation, along with equal opportunities for leadership at every stratum of decision-making in economic, political, and public domains. Additionally, it encompasses the vital objective of granting women equitable rights in accessing economic resources (U.N., 2015).

However, gender-based discrimination still persists across nearly all countries worldwide, making economic resources less acceptable to women. This encompasses both non-agricultural and manufacturing sectors. This discrimination is notably evident in the realm of worker earnings, wherein female workers typically receive lower compensation compared to their male counterparts (Anker, 2001). This divergence in earnings between genders crystallizes into what is commonly referred to as the gender wage gap.

The gender wage gap obstructs career advancement opportunities among women. Women who receive lower pay face barriers to moving up their career hierarchy, as they are less likely to be promoted into leadership roles. This is partly due to the fact that employers tend to invest more in the development of employees whom they believe will generate higher incomes. Moreover, the

wage gap has a broader economic impact by limiting women's spending power, potentially resulting in slower economic growth. In essence, the gender wage gap causes economic inequality, threatens women's financial stability and retirement prospects, and hinders career progression. Consequently, the gender wage gap carries substantial implications, culminating in noteworthy macroeconomic repercussions stemming from disparities in both male and female occupational decisions and gaps in labor force engagement (Si et al., 2021).

Considering the widespread issues associated with the gender wage gap, which affect countries worldwide, including both developed and developing nations, it's crucial to take concerted action to reduce its impact. The measurement of the gender wage gap in developing countries holds immense significance as it serves the dual purpose of unveiling the roots of social inequality and offering valuable insights to policymakers for the formulation of effective strategies to augment household incomes. Timor-Leste, a developing country located in Southeast Asia, continues to grapple with a considerable gender gap. Notably, according to World Economic Forum (WEF) in the 2022 gender gap index rankings, its position stood at 56th, with a gender gap index of 0.730. In 2023, the situation worsened as the gender gap index rank fell to 95th, with a gender gap index of 0.693. This index implies that Timor-Leste successfully closed the gender gap to up to 73 percent in 2022; however, it failed to close the gap in 2023, where it only closed 69.3 percent, making it even worse compared to previous year (WEF, 2023).

The gender gap index comprises diverse sub-indexes, one of which is the economic participation and opportunity sub-index. According to the report from the World Economic Forum (WEF, 2022), in 2021, Timor-Leste achieved a significant reduction in the gender gap for economic participation and opportunities, with a rate of 72.4 percent. Nevertheless, in 2022, the country's performance in narrowing this gap slightly decreased, as it reached a level of 72.1 percent. In 2023,

the economic participation and opportunity index declined dramatically to 57.4 percent making Timor-Leste ranked 120th place among 146 countries. At its current rate, it would take 189 years to completely close the gender gap, in other words, to achieve a 100 percent gender gap closure in East Asian countries, including Timor-Leste (WEF, 2023).

Since gaining independence in 2002, Timor-Leste has consistently struggled to close the gender gap, with its gender gap index ranking remaining consistently below the average each year including economic participation and opportunity gap. The economic participation and opportunity sub-index is comprised of key indicators, including the labor-force participation rate, wage equality, and estimated earned income. As highlighted in the Labor Force Survey Report 2021 published by the General Directorate of Statistics (GDS) in 2022, a noticeable gender disparity exists in labor force participation, whereby women exhibit a lower rate of engagement compared to men. Curiously, despite women constituting a larger proportion of the labor force population across all age groups, their participation remains lower. In the realm of earnings, a gender pay gap is prevalent, indicating that women earn approximately 6.3 percent less on average than their male counterparts among salaried employees at large. It's noteworthy that the average earnings for women stand at 236 US dollars, which falls beneath the overall average wages of salaried employees in Timor-Leste, pegged at 248 US dollars. In a contrasting scenario, men's average earnings surpass the overall average, amounting to 252 US dollars.

These findings underscore the persistence of gender-based wage disparities within Timor-Leste's workforce, reflecting the need for comprehensive interventions to address this overarching issue. To better understand gender-based wage disparities, this study aims to assess the factors that affect the wages of working-aged men and women in Timor-Leste using multiple linear regression. It also seeks to understand the factors contributing to the gender wage gap, distinguishing between

explained factors (related to characteristics) and unexplained factors (potentially related to discrimination) using the Blinder-Oaxaca decomposition method.

Problem Identification

The quantum of wages allocated to workers is intricately linked to supportive factors such as workers' productivity. One argument is that women should rightfully receive lower pay compared to men due to a perceived lower productivity level. This perception is closely intertwined with variables such as education and labor market experience, which, in turn, influence women's occupational choices (Anker, 2001).

In the context of developing countries, extensive research reveals that the gender wage gap can be ascribed to a multitude of factors, including differences in educational attainment, variances in professional experience, divergent occupational preferences, the impact of motherhood, and instances of gender-based discrimination (Si et al., 2021; Gunderson, 1989). Furthermore, the interrelationship between women's education and experience with their chosen occupations is bidirectional. Women's lack of access to certain occupations may stem from an absence of requisite education or experience, thus limiting their opportunities.

Furthermore, neoclassical and human capital theories highlight that women tend to possess lower human capital. This stems from starting with less education and less relevant fields of study, as well as acquiring limited work experience due to intermittent job participation related to family and household obligations. Women are predominantly tasked with domestic chores and childcare duties on a global scale. These responsibilities often lead to reduced work experience for many women, either due to their premature and enduring exit from the labor force, or through temporary withdrawals to cater to the needs of young children (Anker, 2001).

Studies have shown that wage disparities between men and women commonly come from two main components: 1) differences in productivity-related variables, which encompass factors like education, field of study, training, experience, age, firm size, work hours, and health, which are considered legitimate factors contributing to variations in wage rate; 2) differences in the outcomes that men and women receive for their attributes, which is often associated with discrimination within the labor market (Oaxaca, 1973).

This study will select several variables or attributes related to worker productivity factors as independent variables to examine their impact on the monthly wages of male and female workers in Timor-Leste. This analysis is conducted using data from the Timor-Leste Labor Force Survey (TL-LFS) for the year 2021.

Research Objective

Building upon the background and problem identification outlined earlier, the objectives of this study include:

- Providing a cross-tabulation of the relationship between productivity related variables and wages among the working-age population of both men and women who are employed in Timor-Leste.
- Assessing the impact of productivity-related variables on wages for the working-age population of both men and women who are employed in Timor-Leste.
- Seeking to understand the factors contributing to the gender wage gap, distinguishing between explained factors (productivity related characteristics) and unexplained factors (potentially related to discrimination) among the working-age population aged 15 years and above who are actively employed in Timor-Leste.

Chapter 2. Literature Review

Gender disparity is a prominent social issue prevalent across numerous countries worldwide, encompassing both developed and developing countries. This disparity underscores the unequal social treatment of women compared to men, affecting various aspects such as education, health, political empowerment, and economic opportunities. One critical concern of this inequality is the gender wage gap, which encompasses disparities in labor payment based on gender.

According to 2M Research (2019), the gender wage gap can be defined as the disparity in average pay between men and women, with men typically earning more. This gap can be categorized into two forms: the controlled wage gap, also referred to as the adjusted pay gap, which considers factors like occupation, experience, and qualifications, and the uncontrolled wage gap, which simply compares the mean earnings of all men and women without considering job titles, experience, industry, location, or education.

To better understand the gender wage gap, researchers distinguish between labor supply and demand factors, especially in the context of occupational segregation. Neoclassical and human capital theories, as presented by Anker (2001), provide a common framework for explaining occupational segregation. According to neoclassical economics, both workers and employers act rationally, and labor markets operate efficiently. Workers seek roles offering the highest pay, considering their abilities, constraints, and preferences, while employers aim to maximize profits by increasing productivity and reducing costs (Gunderson, 1989). This competitive environment, combined with efficient labor markets, leads employers to compensate workers based on their marginal product.

Moreover, in accordance with neoclassical economics and human capital theory, gender-based occupational segregation results from systematic differences in the human capital accumulation of men and women. Women often attain lower levels of education than men and choose fields of study with limited relevance in the labor market. Additionally, women may have shorter career tenures due to exiting the workforce upon marriage or engaging in part-time employment for childcare. These factors collectively impact women's productivity and, consequently, their earnings (Anker, 2001).

Previous Studies

Numerous researchers have investigated the gender wage gap in various countries, both developed and developing, employing their own distinct variables and analytical methodologies. Their findings have yielded different results. It is noteworthy that, to date, no study has addressed the issue of the gender wage gap in Timor-Leste. This study will draw upon research conducted in other developing countries that share similar characteristics with Timor-Leste in order to investigate the gender wage gap within this context.

According to previous research, the gender wage gap can be influenced by geographical location. This is primarily attributed to the substantial variations in wages between different regions, arising from disparities in the cost of living and local economic conditions. Notably, urban areas often exhibit a more pronounced gender wage gap, owing to the elevated average wage levels and a higher prevalence of industries that have historically favored male employees with higher payment. Conversely, rural areas tend to manifest a comparatively narrower wage gap, which can be attributed to their lower overall wage levels and a distinct industry distribution. Nasution and Yuniasih (2022), who conducted an analysis of gender wage disparities in the eastern regions of Indonesia—a geographical area sharing similar characteristics to Timor-Leste—it was observed

that residing in urban areas exerted a positive influence on wages for both males and females. Similar conclusions were drawn in studies conducted by Putri et al., (2022), Blinder (1973), and Mardiana (2022).

Nasution and Yuniasih (2022) used the Blinder-Oaxaca decomposition method and found that the residential area also emerged as a significant variable influencing the gender wage gap. In all three years, it was found that men residing in urban areas received lower wages than women. Comparable findings were also reported by Hennigusnia in 2014. A contrasting result was discovered in a study conducted by Putri et al., (2022), where residing in urban areas proved advantageous for men, with men in urban areas receiving higher wages than women.

Age also plays a significant role in the gender wage gap, where younger individuals, both male and female, typically earn less due to limited work experience. As they age, the gap widens, with men often experiencing more substantial wage growth and career advancement. This is attributed to factors like career interruptions for family responsibilities and occupational segregation, where women are overrepresented in lower-paying roles. These results are consistent with research conducted by Nasution and Yuniasih (2022), Hennigusnia (2014), Blinder (1973), and Mardiana (2022), each study finding that age positively influences wages for both men and women. These studies also found that the age factor disproportionately benefits men, resulting in higher wages for men compared to women.

Educational attainment also has a significant impact on earnings and the gender wage gap. Typically, those with higher education earn more. While women have made progress in education, the wage gap persists even when education levels are the same. This is due to factors like gender bias, field of study differences, and stereotypes in certain industries. Putri et al., (2022) examine the gender wage gap in Maluku Province, which shares similarities with Timor-Leste, and find that

more education enhances wages for both men and women. This aligns with the findings in studies by Nasution and Yuniasih (2022), Hennigusnia (2014), and Mardiana (2022), which emphasize the significant positive impact of education on wages for both genders. Nasution and Yuniasih (2022) discovered that men with higher education received lower wages than women, but if their education was limited to high school, they earned more than women. Putri et al., (2022) revealed that men with high school education or higher received higher wages than women. Similar findings were reported by Blinder (1973).

The choice of working in the formal or informal sector has a substantial impact on wage for both men and women, and it contributes to the gender wage gap. Some sectors pay women less and have a higher representation of women in lower-paying roles. Discriminatory practices, stereotypes, and undervaluation of work in female-dominated sectors all contribute to this wage disparity. Studies by Nasution (2022), Mardiana (2022), and Putri et al., (2022) found that working in the formal sector tends to enhance wages for both men and women compared to working in the informal sector. Nasution and Yuniasih (2022) discovered that working in the formal sector can be advantageous for women, as women employed in the formal sector receive higher wages than men. Putri et al., (2022) found contrasting results, where working in the formal sector benefits only men.

The gender wage gap has also been found to vary across temporary versus permanent employment. Temporary or contract jobs often come with lower pay, fewer benefits, and less job security, which women more frequently hold, contributing to the wage gap. Permanent jobs, more often filled by men, offer better pay and opportunities for career growth, further widening the wage disparity. Additionally, temporary workers are less motivated to develop job-specific skills because their contracts may not be renewed, and employers are less inclined to provide them with internal

training (Bowlus and Grogan, 2009; Simon et al., 2017). According to Blinder (1973), seasonal employment appears to result in higher wages for men than women.

The choice between full-time and part-time employment plays a significant role in wages and the gender wage gap. Women often choose part-time work due to caregiving responsibilities, which can limit earnings. Part-time positions generally offer fewer benefits and less job security, contributing to the wage gap. Research by Nasution and Yuniasih (2022), Mardiana (2022), and Putri et al., (2022) employ a variable related to working hours, specifically the total number of hours worked and find that an increase in working hours can lead to higher wages for both men and women. Nasution and Yuniasih (2022) found the number of working hours only benefits men in the context of the gender wage gap, while Putri et al., (2022) found that working hours can be advantageous for women, with an increase in working hours resulting in women receiving higher wages than men.

Marital status also plays a role in the gender wage gap. Research shows that married men tend to earn more than single men, while married women often earn less than single women. This can be attributed to women reducing their work hours due to domestic responsibilities.

Mardiana (2022) found that being married has a positive impact on wages in Java Island, Indonesia. Studies by Nasution and Yuniasih (2022), Putri et al., (2022), Hennigusnia (2014), and Oaxaca (1973) also found that being married can increase wages for both men and women. When considering the gender wage gap, marital status benefits only men, with married men receiving higher wages than married women, thereby widening the gender wage gap (Nasution and Yuniasih, 2022; Putri et al., 2022; Hennigusnia, 2014).

To identify the variables that influence wages, researchers employ multiple regression analysis. To examine the gender wage gap, many researchers used the Blinder-Oaxaca

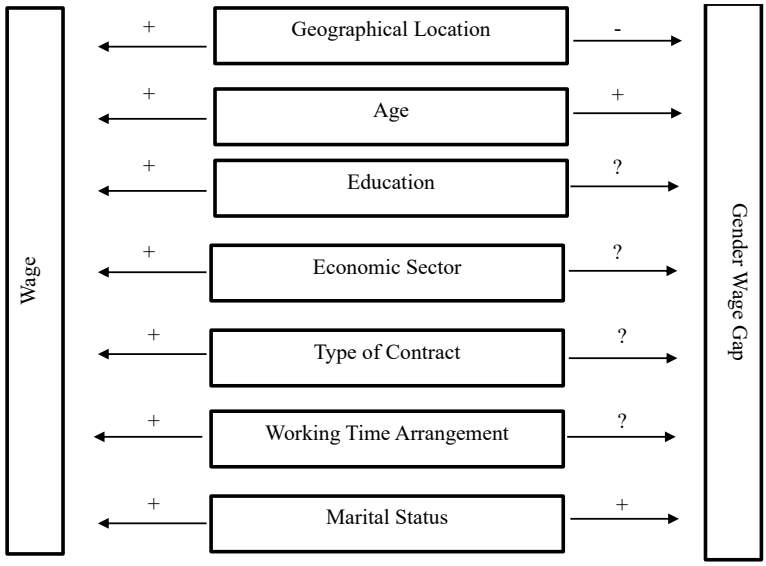
decomposition method to assess the magnitude of the wage gap including disparities attributed to explained and unexplained factors. Examples of research utilizing the Blinder-Oaxaca decomposition can be found in Nasution and Yuniasih (2022), Putri et al., (2022), Hennigusnia (2014), and Jann (2008).

Summary of Prior Research of Factors Used in Current Research

Drawing from previous studies, this research estimates the effect of geographical location, age, education, economic sector, type of contract, working time arrangement, and marital status on the dependent variable, wages. Additionally, sex is employed as the grouping variable. The relationship between independent and dependent variables within this study is visualized in figure (1).

Figure 1

Relationship between dependent and independent variables



Chapter 3. Methodology

Research Scope

The dependent variable in this study is monthly income in US Dollars, the currency used in Timor-Leste. The independent variables consist of geographical location, age, education level, economic sector, type of contract, working time arrangement, and marital status. Moreover, this research covers the entire territory of Timor-Leste, a developing country located in Southeast Asia. Administratively, Timor-Leste is divided into 12 municipalities and one special autonomy region, Oecusse. The unit of analysis in this study is working-age adult, actively employed in the year 2021 during the Labor Force Survey.

Data Collection

This research is based on secondary data obtained from the Timor-Leste Labor Force Survey (TL-LFS) conducted in 2021. TL-LFS 2021 is the third labor force survey carried out by the General Directorate of Statistics (GDS) in Timor-Leste in collaboration with the Secretariat of State for Vocational Training and Employment (SEFOPE) and the International Labor Organization (ILO). GDS serves as the national statistics office of Timor-Leste, initially operating under the Ministry of Finance. It has since evolved into a public institution and changed its name to the National Institute of Statistics Timor-Leste, Public Institution or *Instituto Nacional de Estatística Timor-Leste Instituição publica* (INETL.IP) in Portuguese.

Data collection for TL-LFS 2021 occurred over two months, in October and November of 2021, with publication taking place in September 2022. The primary objective of the survey was to collect, analyze, and disseminate statistical information regarding the labor force to support evidence-based policy formulation, program development, and monitoring. The TL-LFS provides detailed data disaggregated by gender, age, and region, covering economic aspects of the working-

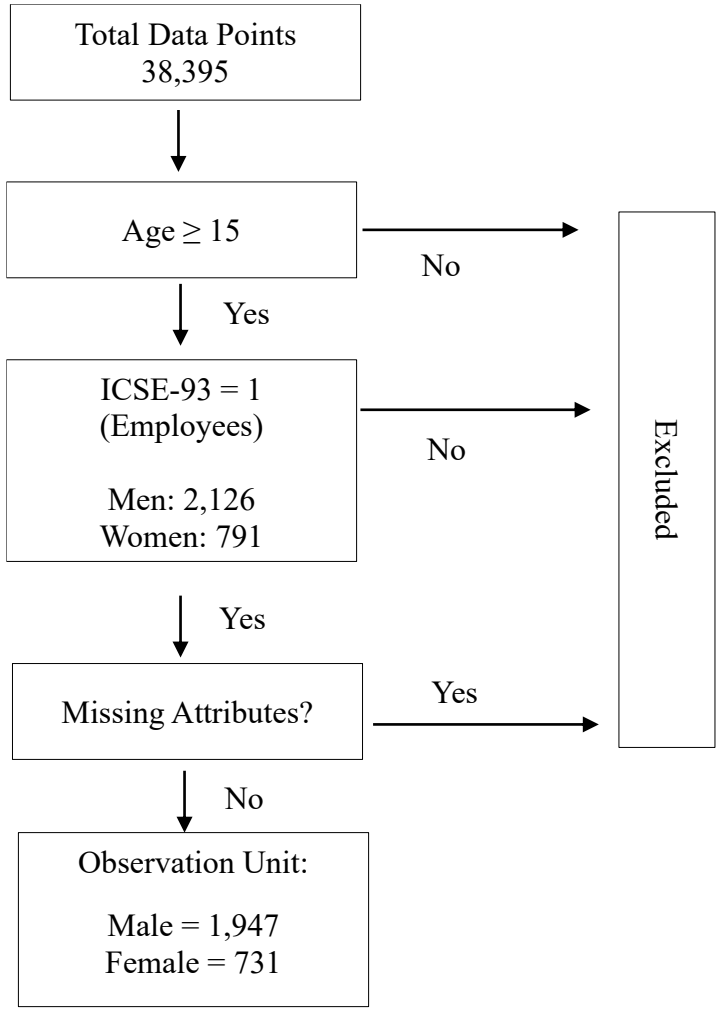
age population, including employment, wages, hours of work, underemployment, and economic inactivity (GDS, 2022).

The sampling method employed in TL-LFS 2021 utilized a two-stage stratified sampling design. The first stage involved the selection of Enumeration Areas (EAs), while the second stage entailed the selection of households within each sampled Enumeration Area. Stratification was based on geographical location, distinguishing between urban and rural areas. As a result, the TL-LFS sample consists of 7,275 households. For this research, the unit of observation is individuals or household members who are part of the working-age population, as defined by those aged 15 years and above.

The raw data set obtained from INETL.IP consists of 38,395 data points, comprising 19,446 men and 18,949 women. From this total data set, a filtration process was applied to select the desired units of observation for this research. The selection was based on age, employment status according to the International Classifications of Status in Employment (ICSE-93) by Hoffman (2003), and the presence of missing values. The chosen units of observation are individuals aged 15 years and above, classified as employees, and with no missing data for variables used in this study. Out of the 38,395 data points, 2,678 data points met the criteria as units of observation for this research, comprising 1,947 men and 731 women. A flowchart depicting the selection process can be found in figure (2).

Figure 2

Flowchart of the selection process for the unit of observation.



Operational Definition of Variables

Dependent Variable

The dependent variable in this research is wage, which represents numerical data. The wage refers to the income received by the observation from his or her main job during the last month, expressed in US dollars.

Grouping Variable

The grouping variable is sex (SEX), which is obtained from information related to identity of respondent during data collection. The variable sex is a categorical variable and categorized into two categories: men and women.

Independent Variables

There are seven independent variables used in this research, which are productivity-related variables. The independent variables include geographical location, economic sector, type of contract, working time arrangement, and marital status, which are categorical data with two categories each, except age, a numerical variable. Therefore, a dummy variable is created for each category. The education level independent variable has three categories, resulting in the creation of two dummy variables. The following describes the variables used in this research:

1. Geographical Location (URBAN)

   The geographical location variable represents the residential status of the unit of observation during the survey. In this research, the geographical location variable can be divided into two categories: urban (URBAN) and rural areas.

2. Age (AGE)

   The age variable (AGE) refers to the age of the units of observation at the time of the survey, based on their last birthday. AGE is in numerical format and starts from 15 years.

3. Education (EDU_ADV and EDU_INT)

   Education is defined as the highest level of education completed by the unit of observation. Education levels can be categorized into three categories: advanced education level (EDU_ADV), intermediate education level (EDU_INT), and basic education level.

4. Economic Sector (FORMAL_SEC)

   The economic sector refers to the part of the economy that produces similar goods and services and can be divided into two categories: the formal sector (FORMAL_SEC), which is regulated and monitored by the government, and the informal sector, which is not subject to government regulation or monitoring.

5. Type of Contract (PERMANENT)

   The type of contract variable can be defined as the classification of contracts based on the duration for which they are valid. Types of contracts can be categorized into two: a permanent contract (PERMANENT), which is an employment contract without a fixed end date, and a temporary contract, which is an employment contract with a predetermined end date.

6. Working Time Arrangement (FULL_TIME)

   A working time arrangement refers to a formal agreement between an employer and an employee that outlines the expected number of working hours, the specific days, and the time of day the employee is scheduled to work. An observation is considered working full-time (FULL_TIME) if he or she was working 40 hours or more per week, while part-time arrangements typically involve working fewer than 40 hours per week.

7. Marital Status (MARRIED)

   Marital status refers to legal status in terms of marriage. Marital status can be categorized into two groups: married (MARRIED), which indicates that an individual is either married or currently living with their partner, and not married, which encompasses those who are single, divorced, or separated.

Table 1

Operational definition of variables

Variable	Description	Category Description	Reference Category
Dependent Variable:			
WAGE	Monthly earning from the main job	Earning in US dollar	
Grouping Variable:			
SEX	Sex	1 if sex is male and 2 otherwise	-
Independent Variables:			
URBAN	Geographical location	1 if the geographical location is urban area, 0 otherwise	Rural
AGE	Age	Age in years	
EDU_ADV	Advanced education level	1 if the education level is advanced, 0 otherwise	Basic education level
EDU_INT	Intermediate education level	1 if the education level is intermediate, 0 otherwise	Basic education level
FORMAL_SEC	Economic sector	1 if the economic sector is formal, 0 otherwise	Informal economic sector
PERMANENT	Type of contract	1 if the type of contract is permanent, 0 otherwise	Temporary
FULL_TIME	Working time arrangement	1 if the working time arrangement is full-time, 0 otherwise	Part-time
MARRIED	Marital status	1 if the marital status is married cohabited, 0 otherwise	Others

Analytical Method

To achieve the research objectives, this study employs both descriptive and inferential analysis methods. Descriptive analysis utilizes tables and graphs, while inferential analysis employs Ordinary Least Square (OLS) analysis and the Blinder-Oaxaca decomposition method.

Descriptive Analysis

Descriptive analysis is a statistical method used to analyze data by describing or depicting data through the use of tables, graphs, or charts to facilitate understanding. The general objective of descriptive analysis is to obtain an overall picture of the various characteristics of a phenomenon or issue. Based on the research objectives, this study will employ graphical tools like kernel density plots to examine the wage distribution for both men and women. Additionally, tables are utilized to provide an overview of wage based on productivity variables for the employed working-age sample.

Inferential Analysis

1. Multiple Linear Regression

To address the research objective of assessing the impact of productivity factors on wages for both men and women, this study employs the Ordinary Least Square (OLS) method by implementing multiple linear regression. Multiple linear regression is a regression model with one dependent variable and several independent variables (Gujarati and Porter, 2010). Before employing multiple linear regression in this analysis, it is essential to ensure that the dataset used satisfies several OLS assumptions (Stock and Watson, 2020) as follows:

- The conditional distribution of u_i given X_i has a mean of zero, where X represents an independent variable, i represents observation i, and u represents the error term.

- (X_i , Y_i), $i = 1, \ldots, n,$ are independently and identically distributed, where Y represents dependent variable, and
- Large outliers are unlikely.

To ensure these assumptions are met, various diagnostic tests must be conducted on the regression model for both men and women. Following are the assumptions that need to be tested:

a. Assumption of Normality

The normality assumption test can be conducted to determine whether the residuals in the regression model follow a normal distribution. This is one of the essential assumptions when using simultaneous (*F*-test) and partial (*t*-test) hypothesis tests (Ghozali, 2018). The Jarque Bera test can be used for testing normality, with the null hypothesis H0: the residuals are normally distributed and the alternative hypothesis H1: the residuals are not normally distributed. The Jarque Bera test can be calculated using the equation (1).

$$JB = \frac{n}{6}\left(S^2 + \frac{(K-3)^2}{4}\right) \quad (1)$$

Where n is denoted as total observation, S is Skewness, K is kurtosis. The null hypothesis is rejected at α=5 percent if $JB \geq X^2_{a,df}$ or the p-value is less than α.

b. Assumption of Multicollinearity

The multicollinearity assumption test aims to determine whether there is a severe correlation between the independent variables in the regression model. To test the assumption for multicollinearity, the coefficients of the Variance Inflation Factor (VIF) is used, a measure of the impact of multicollinearity on a regression model, indicating how much an independent variable's

variance is influenced by other variables (Studenmund, 2017). Multicollinearity is a problem among the independent variables if the VIF value is greater than 5.

c. Assumption of Heteroskedasticity

The test for heteroskedasticity aims to determine whether there is unequal variance of residuals from one observation to another in the model. A good regression model should have constant or homoscedastic variance. Heteroskedasticity occurs in cross-sectional data since it represents various scales. To detect heteroskedasticity, the Breusch-Pagan test is performed by regressing the independent variables on squared residuals obtained from the model. The null hypothesis H0 assumes that the variance of residuals is constant across all observations, which implies homoscedasticity and the alternative hypothesis H1: the variance of residuals is not constant and exhibits variation among observations, indicating the presence of heteroskedasticity.

d. Outliers

In linear regression (OLS) methods, the assumption of outliers is one of the classical assumptions that must be met to ensure that the resulting regression parameter estimates are unbiased and efficient. An outlier is a data point that deviates from the general pattern of the rest of the data. The presence of outliers can influence the estimation of regression parameters, making regression analysis results invalid. Outliers can be detected in various ways, and one of them is by using the Z-Score as calculated in equation (2). If the Z-Score value is greater than 2.5 or less than -2.5, it can be suspected as an outlier.

$$Z_i = \frac{(x_i - \mu)}{\sigma}, where\ i = 1{:}n \quad (2)$$

Huber-White Robust Regression

After ensuring that all the classical assumptions mentioned above are met, it is considered safe to use the model. If any of the classical assumptions are violated, the Huber-White robust regression technique is employed. Robust regression yields estimated standard errors that are robust against outliers and resistant to heteroskedasticity in the error terms.

Model Development

The wage of working adults in Timor-Leste is assumed to be affected by geographical location, age, education level, economic sector, type of contract, working time arrangement, and marital status. The theoretical model based on this assumption can be written as follows:

$$Wage = f(Geographical\ Location, Age, Education\ level, Economic\ Sector, + Type\ of\ Contract, working\ time\ arrangement,\ \ Marital\ Status) \quad (3)$$

To test the theoretical model, a multiple regression model can be formulated as shown in equation (3). Since the primary focus when analyzing wage disparities is on the percentage variation of wages, a semi-log model is applied to the regression model (Mincer, 1974).

$$\begin{aligned} ln(WAGE)_i = {} & \beta_0 + \beta_1 URBAN_i + \beta_2 AGE_i + \beta_3 EDU\_ADV_i + \beta_4 EDU\_INT_i \\ & + \beta_5 FORMAL\_SEC_i + \beta_6 PERMANENT_i + \beta_7 FULL\_TIME_i \\ & + \beta_8 MARRIED_i + \varepsilon_i \quad (4) \end{aligned}$$

In this transformed equation, $ln(WAGE)_i$ represents the natural logarithm of the wage for the *i-th* observation. The coefficients $\beta_0,\ \beta_1,\ \beta_2,\ \ldots,\ \beta_p$ denote the parameters that capture the

relationships between the independent variables $x_{1i},\ x_{2i},\ \ldots,\ x_{pi}$ and the logarithm of the wage. The term ε_i represents the error term associated with the *i-th* observation. Utilizing the semi-log model in this manner allows for a more nuanced analysis of the percentage variation in wages, enhancing the ability to explore the underlying factors affecting wages earned by both men and women. Consequently, the equations for women and men can be formulated as follows:

$$ln(WAGE)_{iW} = \beta_W X_{iW} + \varepsilon_{iW} \quad (5)$$

$$ln(WAGE)_{iM} = \beta_M X_{iM} + \varepsilon_{iM} \quad (6)$$

In these equations, $ln(WAGE)_{iW}$ and $ln(WAGE)_{iM}$ represent the natural logarithms of wages for individual women and men, respectively. The coefficients β_W and β_M capture the relationships between the respective independent variables X_{iW} and X_{iM} and the logarithms of wages. The terms ε_{iW} and ε_{iM} denote the error terms associated with women's and men's wage equations, respectively.

Simultaneous Parameter Testing

Once the model is formulated, its adequacy can be tested by conducting a simultaneous parameter test using an *F*-test as shown in equation (7). The purpose of simultaneous testing is to determine whether all independent or explanatory variables collectively influence the dependent variable (Gujarati and Porter, 2010). To examine whether all independent variables simultaneously influence the wages of both men and women or, in other words, if they have a collective effect. The null hypothesis is $H0: \beta_1 = \beta_2 = \ldots = \beta_8 = 0$ (meaning that none of the independent variables affect wages for men and women in Timor-Leste), and the alternative hypothesis is *H1:*

at least one $\beta_p \neq 0$ (at least one independent variable affects wages for men and women in Timor-Leste), where *p = 1, 2, ..., 8.* The null hypothesis *H0* is rejected at a significance level of α = 5 percent if the *F*-test > $F_{\propto,df}$ or if the *p*-value is less than the significance level.

$$F = \frac{R^2/(k-1)}{(1-R^2)/(n-k)} \quad (7)$$

Partial Parameter Testing

When the simultaneous parameter test results in rejecting *H0*, the next step is to perform partial testing to determine which variables have a significant influence on wages for men and women, respectively. The partial coefficient testing uses the *t* – test, which is calculated using equation (8). The null hypothesis is $H0: \beta_p = 0$ (the independent variable *p* is not significant in the model), and the alternative hypothesis is $H1: \beta_p \neq 0$ (the independent *p* variable is significant in the model), where *p = 1, 2, ..., 8.* The null hypothesis can be rejected if the absolute value of the *t*-test is greater than $X^2_{\propto,n-p-1}$, or if the *p*-value is less than the significance level of alpha (α).

$$t = \frac{\hat{\beta}_p}{SE(\hat{\beta}_p)}, p = 1:8 \quad (8)$$

Model Interpretation

After conducting both simultaneous and partial testing, the results are used to determine the most suitable model for estimating factors that affect wage with the equations for men and women, respectively. Based on the model, the interpretation of beta coefficients can be performed by understanding the partial slope coefficients (Gujarati and Porter, 2010). The coefficient β_p

quantifies the change in the average value of the dependent variable, which is log of wage, for a one-unit change in the corresponding independent variable, X_p, while keeping the values of other independent variables constant.

2. Blinder-Oaxaca Decomposition

After estimating equation (5) and equation (6), the estimates are used as the basis for Blinder-Oaxaca decomposition to measure the wage gap between genders and calculate the contributions of the explained factor, which pertains to differences in characteristics, as well as the unexplained factor. In this context, the Blinder-Oaxaca decomposition method dissects the sources of the gender wage gap, revealing the extent to which variations in characteristics contribute to the wage disparity and quantifying the portion that remains unexplained. Based on the ordinary least squares estimation, the average wage for women and men can be expressed as:

$$\overline{ln(WAGE)}_W = \hat{\beta}_W \bar{X}_W \quad (9)$$

$$\overline{ln(WAGE)}_M = \hat{\beta}_M \bar{X}_M \quad (10)$$

The average wages for women and men are represented by $\overline{ln(WAGE)}_W$ and $\overline{ln(WAGE)}_M$, respectively. The vectors of estimated coefficients $\hat{\beta}_W$ and $\hat{\beta}_M$ are used to predict these average wages based on the average values of the respective vectors of independent variables $\bar{X}_W$ and $\bar{X}_M$. These equations form the foundation for understanding and analyzing the gender wage gap within the studied context using a semi-log model. The equation for the wage gap can be derived using equation (11).

$$\Delta\overline{WAGE} = \overline{ln(WAGE)}_M - \overline{ln(WAGE)}_W \quad (11)$$

$$\Delta\overline{WAGE} = \hat{\beta}_M\bar{X}_M - \hat{\beta}_W\bar{X}_W = \hat{\beta}_M(\bar{X}_M - \bar{X}_w) + \bar{X}_W(\hat{\beta}_M - \hat{\beta}_W) \quad (12)$$

In equation (12), the term $\hat{\beta}_M(\bar{X}_M - \bar{X}_w)$ represents the explained factor, accounting for the difference in characteristics between men and women and its impact on the wage gap. The term $\bar{X}_W(\hat{\beta}_M - \hat{\beta}_W)$ represents the unexplained factor, capturing the portion of the wage gap that remains unaccounted for by differences in characteristics, and $\Delta\overline{WAGE}$ represents the total wage gap, combining explained and unexplained factors. Equation (12) serves as a crucial framework for decomposing the gender wage gap into these two distinct components, providing an estimate of the factors contributing to wage disparities between men and women.

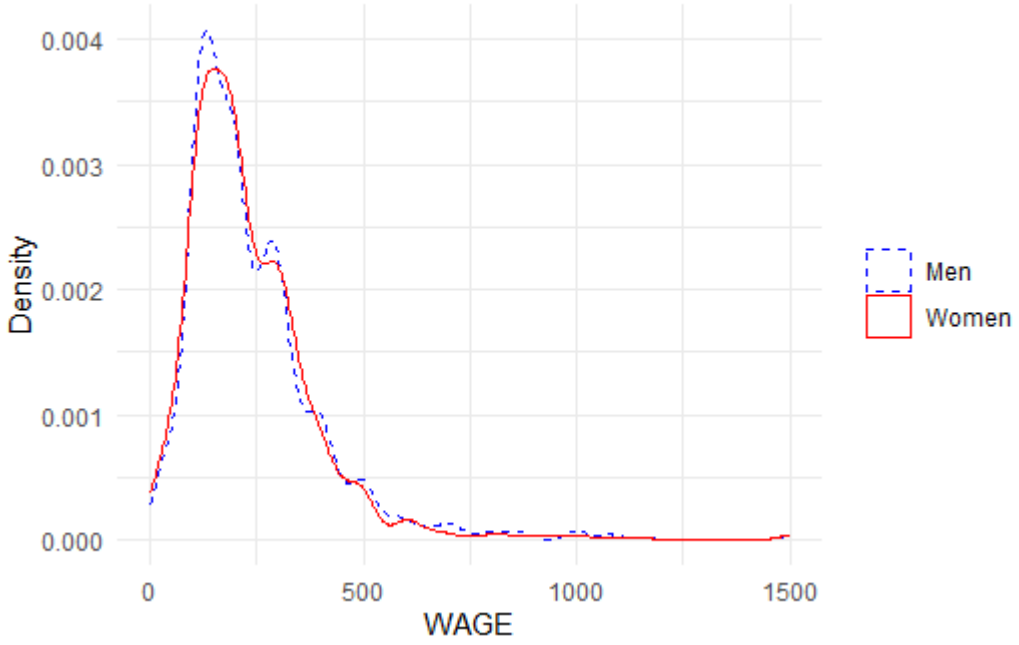
Chapter 4. Results

General Overview of Monthly Wage in Timor-Leste

Figure (3) shows the wage distribution for men and women workers aged 15 and above, and one can see a similar density pattern exists for men and women for Timor-Leste. In both cases, the majority of individuals receive monthly wages of around 115 US dollars, which corresponds to the minimum wage applied in Timor-Leste.

Figure 3

Kernel density plot of monthly wage.



Source: TL-LFS 2021, processed.

Women are more dominant in occupations that are paid below the minimum wage and in positions that pay around the average monthly wage, specifically in job categories falling within the range of 120 US dollars to 350 US dollars. Men are more prevalent in occupations paying at

or above the minimum wage, particularly those offering wages exceeding 350 US dollars. Furthermore, in Figure (3), it is evident that nearly all of the unit of observations in this study are paid below 350 US dollars.

Table (2) provides the average wage earned by the 1,947 males and 731 females which make up the sample used in this study. Table (2) also provides the average wage across geographic location and personal characteristics of this sample. The sample is predominantly located in urban areas, aged 24-59 years old, possess educational qualifications at the intermediate level or below, are employed in the informal economic sector, maintain permanent employment contracts, work on a full-time basis, and are married.

Men in this study primarily reside in urban areas, possess intermediate-level education, work in the informal sector, hold permanent employment contracts, work full-time, and are married. Women are also predominantly located in urban areas, possess advanced educational qualifications, work in the formal sector, are engaged in full-time employment, and are married. From an overall perspective, both men and women observational units exhibit largely similar characteristics, with the key distinction being that a greater proportion of women have higher levels of education.

Table (2) indicates that men receive a monthly average wage higher than women, with an average of 326.64 US dollars per month for men, and 312.62 US dollars per month for women. The average wage is higher among employees who reside in urban areas, possess an advanced education level, work in the formal sector, hold permanent employment contracts, work part-time, and are married. The highest average monthly wages are observed among employees with an advanced education level (407.53 US dollars) and those working in the formal sector (360.25 US dollars).

Table 2

Tabulation of the sample distribution and dependent variable WAGE with independent variables.

Variables	Category	Total Observations		Mean Wage		
		Male	Female	Male	Female	Total
Geographical Location	Rural	816	246	285.27	203.29	266.28
	Urban	1,131	485	356.49	368.06	359.96
Age (5-year age bands)	15-19	25	6	115.60	1,776.39	437.04
	20-24	100	45	172.64	143.66	163.64
	25-29	221	117	322.17	258.66	300.18
	30-34	313	128	266.90	333.37	286.19
	35-39	300	134	277.62	275.09	276.84
	40-44	235	79	367.20	312.88	353.53
	45-49	279	95	407.88	375.06	399.54
	50-54	216	63	391.84	311.62	373.73
	55-59	151	37	310.68	263.51	301.4
	60-64	75	17	348.81	298.24	339.46
	65+	32	10	624.99	679.90	638.06
Advanced Education Level	Others	1,415	407	296.97	234.52	283.02
	Advance	532	324	405.58	410.71	407.53
Intermediate Education Level	Others	1,066	420	333.75	371.01	344.28
	Intermediate	881	311	318.05	233.74	296.06
Economic Sector	Informal	1,075	355	303.86	248.58	290.14
	Formal	872	376	354.73	373.07	360.25
Type of Contract	Temporary	372	126	347.90	208.35	312.59
	Permanent	1,575	605	321.62	334.33	325.15
Working Time Arrangement	Part Time	584	254	360.27	257.45	329.11
	Full Time	1,363	477	312.24	341.98	319.95
Marital Status	Single/Widowed	323	218	235.08	268.43	248.52
	Married/Union/ Cohabiting	1,624	513	344.86	331.38	341.62
Total		1,976	731	326.64	312.62	322.81

Source: TL-LFS 2021, processed.

Conversely, the lowest average monthly wages are recorded for individuals who are single and reside in rural areas, with average monthly wages of 248.52 and 266.28 US dollars, respectively. The average wage for men is higher among those who reside in urban areas, have an

advanced education level, work in the formal sector, have temporary employment contracts, work part-time, and have a marital status of being married. A similar pattern is observed among women, with the exception that female workers under permanent employment contracts receive a higher average wage compared to their counterparts under temporary contracts.

Factors Affecting Monthly Wage for Men and Women in Timor-Leste.

The first stage of the Blinder-Oaxaca decomposition method is to estimate the parameters of equations (5) and equation (6). To validate the model in equations (5) and equation (6), several tests are conducted.

a. Assumption Test

From the results of the assumption checks presented in Table (3), it is evident that there are violations of the normality assumption, indicating that the residuals in the regression model do not follow a normal distribution. Furthermore, there is also evidence of heteroskedasticity violations, signifying that the variance of the residuals is not constant across all levels of the independent variables. In addition, outliers are present in the dataset, with 63 outliers found for men and 24 for women. To address these issues Huber-White regression is employed in this study. Huber-White regression provides robust standard errors for the coefficient estimates that are resilient to outliers and heteroskedasticity. The normality assumption can be disregarded since both samples for men and women have a large size, as per the central limit theorem, which suggests that with larger sample sizes, the distribution tends to be closer to normal.

Table 3

Summary of assumption checks for wage model

Assumption	Test	Male	Female	Decision
Normality	Jarque-Bera	JB > $X^2_{\propto,df}$	JB > $X^2_{\propto,df}$	Does not Qualify
Multicollinearity	VIF	VIF < 5 for all independent variables	VIF < 5 for all independent variables	Qualify
Heteroskedasticity	Breusch Pagan	Significant	Not Significant	Does not Qualify
Outlier	Z-Score (±2.5)	63	24	Does not Qualify

Note: See appendix B for more detail.

After addressing violations of classical assumptions, the results of the analysis using robust regression are summarized in Table (4).

Table 4

Regression result, dependent variable = ln (WAGE)

Variable	Men		Women	
	Coefficients	***t*-stat.**	**Coefficients**	***t*-stat.**
URBAN	0.1052***	3.3000	0.1725***	3.4600
AGE	0.0105***	6.5200	0.0115***	4.1400
EDU_ADV	0.5629***	12.2100	0.8261***	8.1100
EDU_INT	0.1984***	4.6100	0.4183***	4.1800
FORMAL_SEC	0.1732***	5.3100	0.2351***	4.6500
PERMANENT	0.1288**	2.5800	0.2086***	3.0900
FULL_TIME	0.0619*	1.6500	0.1732***	3.1600
MARRIED	0.0678	1.5800	0.0488	0.8300
CONSTANT	4.3216	-	3.7658	-
F-Statistics	***50.35******		***25.49******	
Adj. R-Squared	***0.1753***		***0 .2519***	

** < .1, ** < .05, *** < .01 two-tailed test.*

b. Simultaneous Parameter Testing

Table (4) shows the F-statistic for the regression model for men is 50.53, significant at the 0.01 level. This indicates that at least one estimated coefficient of the independent variables used in the model is significantly different from zero. The adjusted R-squared of the model is 0.1753, which means that the model can explain 17.53 percent of the variability in logged monthly wages for men. The regression model for women yields an F-statistic of 25.49, also significant at the 0.05 level. This suggests that there is at least one estimated coefficient of the independent variables in the model that is significantly different from zero for women. The adjusted R-squared of the model is 0.2519, which means that the model provides an explanation for 25.19 percent of the variance in logged monthly wages for women.

c. Partial Parameter Testing

Table (4) indicates that the variable marital status (MARRIED) does not significantly affect monthly wages for either men or women. The variable working time arrangement (FULL_TIME) significantly affects monthly wages for women at a 1 percent significance level, while for men, it is significant at a 10 percent level. At the 0.05 level, all of the other independent variables significantly affect the monthly wages of working-aged men and women in Timor-Leste.

d. Model Interpretation

Based on the results of simultaneous and partial parameter testing, regression equations for both men and women are formulated as follows.

Regression Equation for Men Workers:

$$ln\,(\widehat{WAGE})_{iM} = 4.3216 + 0.1052^{***}\,URBAN_i + 0.0105^{***}\,AGE_i + 0.5629^{***}\,EDU\_ADV_i + 0.1984^{***}\,EDU\_INT_i + 0.1732^{***}\,FORMAL\_SEC_i + 0.1288^{**}\,PERMANENT_i + 0.0619^{*}\,FULL\_TIME_i + 0.0678\,MARRIED_i \quad (13)$$

Regression Equation for Women Workers:

$$ln\,(\widehat{WAGE})_{iW} = 3.7658 + 0.1725^{***}\,URBAN_i + 0.0115^{***}\,AGE_i + 0.8261^{***}\,EDU\_ADV_i + 0.4183^{***}\,EDU\_INT_i + 0.2351^{***}\,FORMAL\_SEC_i + 0.2086^{***}\,PERMANENT_i + 0.1732^{***}\,FULL\_TIME_i + 0.0488\,MARRIED_i \quad (14)$$

*Note: * < .1, ** < .05, *** < .01, two-tailed test*

The estimated coefficient on URBAN is 0.1052 for men and 0.1725 for women. Men living in urban areas earned about 11 percent more than men living in rural areas, and women living in urban areas earned about 17 percent more than women living in rural areas. The estimated coefficients on AGE suggest that each year of age increased wage by about 1 percent for both males and females.

For EDU_ADV, the estimated coefficient is 0.5629 for men and 0.8261 for women, suggesting that men with advanced education level earned 56.29 percent more than men with basic education, while women with advanced education level earned 82.61 percent more than women with basic education. Men with intermediate education (EDU_INT) earned around 19.84 percent

more than men with basic education, and women with intermediate education earned approximately 41.83 percent more than women with basic education.

The estimated coefficient for FORMAL_SEC is 0.1732 for men and 0.2351 for women. Men in the formal sector earned about 17.32 percent more than those in the informal sector, and women in the formal sector earned 23.51 percent more than women in the informal sector. Men with permanent contracts (PERMANENT) earned approximately 12.88 percent more than those with temporary contracts, while women with permanent contracts earned 20.86 percent more than women with temporary contracts.

Men working full-time (FULL_TIME) earned approximately 6.19 percent more than men working part-time, while women working full-time earned about 17.32 percent more than women working part-time. The estimated coefficient for MARRIED is 0.0678 for men and 0.0488 for women, and these coefficients are not statistically significant.

Blinder-Oaxaca Decomposition Results

The results of Blinder-Oaxaca decomposition are used with equation (11) and equation (12) to decompose the wage gap between men and women in Timor-Leste into the explained and unexplained factors. Table (5) reports the results of the Blinder-Oaxaca decomposition, excluding the independent variable that was found to be insignificant in equation (13) and equation (14), MARRIED. According to Gunderson (1989), using excessive control variables often attributes the wage gap more to discrimination.

Using the equation (11), the average difference in logged wage between men and women is 0.0279, which means on average men earn 2.79 percent more than women. However, this difference is not statistically significant. The decomposition shows that insignificant wage gap hides the significant and offsetting effects of explained and unexplained factors. Using equation

(12), the explained factors decrease the wage gaps by a statistically significant 8.6 percent, while the unexplained factors increase the wage gap between men and women by a statistically significant 11.39 percent.

Table (5)

Results of Blinder-Oaxaca decomposition (grouped by sex)

Estimates	Variables	Coefficient	P> |Z|
$\overline{ln(WAGE)_M}$		**5.3365*** **	**0.0000**
$\overline{ln(WAGE)_W}$		**5.3085*** **	**0.0000**
Difference ($\Delta\overline{WAGE}$)		**0.0279**	**0.4090**
Explained [$\widehat{\beta}_M(\overline{X}_M - \overline{X}_w)$]		**-0.0860*** **	**0.0000**
	URBAN	-0.0087**	0.0130
	AGE	0.0238***	0.0000
	EDU_ADV	-0.0953***	0.0000
	EDU_INT	0.0054	0.2230
	FORMAL_SEC	-0.0117***	0.0090
	PERMANENT	-0.0025	0.2890
	FULL_TIME	0.0030	0.1590
Unexplained [$\overline{X}_W(\widehat{\beta}_M - \widehat{\beta}_W)$]		**0.1139**	**0. 0000**

** < .1, ** < .05, *** < .01*

Table (5) also provides the estimated influences of each independent variable on the explained portion of the wage gap. Living in an urban area (URBAN), having an advanced education (EDU_ADV) and working in the formal sector of the economy (FORMAL_SEC) reduce the explained portion of the wage gap. The explained portion of the wage gap increased with age (AGE). The other three factors had no influence on the explained portion of the wage gap.

Age contributes to the wage difference between men and women in Timor-Leste, accounting for 2.38 percent of the gap. The highest education level reduces the gender wage gap, contributing to a 9.52 percent decrease. Similar findings were reported by Nasution and Yuniasih

(2022), where age was also identified as a factor that can increase the gender wage gap, and the highest education level can decrease the gender wage gap.

Residing in urban areas and working in the formal sector also reduced the gender wage gap in Timor-Leste by 0.87 percent and 1.17 percent respectively. This corresponds with the findings of Nasution and Yuniasih (2022) that living in urban areas and working in the formal sector reduce the gender wage gap.

In studies by Nasution and Yuniasih (2022) and Putri et al., (2022) find that variables such as working time arrangement and marital status significantly influence the gender wage gap. In this study, both variables are found not to significantly affect the wage gap. Blinder (1973) finds that working part-time jobs could increase the wage gap between men and women. In this study, the working time arrangement variable is not significant in affecting the wage gap.

The results of this study indicate that the explained factors using decomposition method can decrease the gender wage gap by up to 8.6 percent among working-aged and employed individuals in Timor-Leste. However, studies conducted in locations with characteristics similar to Timor-Leste find that explained factors contribute to an increase in gender wage gap. Examples of studies contradicting this finding can be found in Nasution and Yuniasih (2022), Putri et al., (2022), Hennigusnia (2014), and Mardiana (2022).

Chapter 5. Conclusions and Recommendations

Conclusions

The purpose of this study is to assess the factors affecting the wages of working-age and employed men and women in Timor-Leste and to understand the factors contributing to the gender wage gap between them. This study uses the dataset from TL-LFS 2021, with a total of 2,678 observations of working-age and employed individuals, consisting of 1,947 men and 731 women. On average, both working-age and employed men and women in Timor-Leste earn around 115 US dollars, which is the minimum wage in Timor-Leste. Men earn an average of 326.64 US dollars per month, while women earn an average of 321.62 US dollars.

The findings of this study reveal that several factors influence the wages of working-age and employed men and women in Timor-Leste. These factors include living in urban areas (URBAN), having an advanced education level (EDU-adv), intermediate education level (EDU_INT), working in the formal sector (FORMAL_SEC), having a permanent contract (PERMANENT), and working full-time (FULL_TIME).

This study also finds that the average wage gap between working-age employed males and females in Timor-Leste is 2.79 percent, where men earn, on average, 2.79 percent more than women. In terms of explained factors, on average, men earn 8.6 percent less than women. In terms of unexplained factors, men earn 11.39 percent more than women.

Recommendations

Further Research

This research contributes to an understanding of the factors that affect wages in Timor-Leste, and factors that increase and reduce the gap in wages between men and women. One drawback of this study is the time period studied. Conducting a study within a single specific

timeframe, particularly using data from 2020 and 2021, a period deeply affected by the COVID-19 pandemic, might not yield generalizable results.

Future research might consider a longitudinal study to track gender wage disparities over time, capturing changes and trends. Additionally, expanding the range of variables, such as household size, dependency ratios, and specific fields of study, can provide deeper insights into the factors contributing to wage gaps. It might be worthwhile to partition the data for separate analysis of urban and rural areas, allowing for a more localized understanding of gender wage disparities and the impact of regional contexts.

Policy Implications

An important finding of this study is that unexplained factors increase the wage gap in Timor-Leste by 11.39 percent which could include discrimination. Companies might implement anti-discrimination policies and create an inclusive work culture that values diversity to reduce the unexplained factors. Policies might be implemented that focus on breaking stereotypes related to hiring position and job titles and gender preferences over specific job titles, as well as policies that help lead to ensuring that women have equal opportunities for advancement and are not confined to specific roles due to societal biases.

Another finding of this study reveals that explained factors can lead to a reduction in the wage gap of up to 8.6 percent. Possessing advanced education levels and working in formal sector employment are identified as factors contributing to this decrease. Therefore, there is a need to emphasize and encourage women to pursue careers in the formal sector and attain higher levels of education.

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Appendix A

Output of Descriptive and Inferential Analyses

Table A1

Tabulation of the independent variables with dependent variable WAGE

		Sex		Wage							
		Male	Female	Sex							
				Male				Female			
		Count	Count	Mean	Minimum	Maximum	Standard Deviation	Mean	Minimum	Maximum	Standard Deviation
Geographical Location	Rural	816	246	285.27	1.67	26000.00	998.13	203.29	8.33	600.00	108.61
	Urban	1131	485	356.49	8.33	17333.33	943.05	368.06	8.00	10000.00	905.34
Age (5-year age bands)	15-19	25	6	115.60	21.67	216.67	54.86	1776.39	50.00	10000.00	4029.07
	20-24	100	45	172.64	20.00	2000.00	208.36	143.66	19.17	405.00	71.93
	25-29	221	117	322.17	15.00	17333.33	1324.02	258.66	8.33	4800.00	475.18
	30-34	313	128	266.90	8.33	5200.00	483.48	333.37	16.50	9999.00	896.57
	35-39	300	134	277.62	6.67	3466.67	329.94	275.09	8.00	3466.67	321.07
	40-44	235	79	367.20	8.33	8000.00	805.87	312.88	52.00	5000.00	556.60
	45-49	279	95	407.88	16.67	26000.00	1818.62	375.06	10.00	9999.00	1034.13
	50-54	216	63	391.84	10.00	7020.00	732.48	311.62	50.00	4420.00	539.42
	55-59	151	37	310.68	1.67	2008.00	270.94	263.51	40.00	500.00	101.48
	60-64	75	17	348.81	50.00	2050.00	288.81	298.24	50.00	600.00	115.87
	65+	32	10	624.99	100.00	10833.33	1870.60	679.90	60.00	5000.00	1519.97
Advanced Education Level	Others	1415	407	296.97	1.67	26000.00	1069.48	234.52	8.00	10000.00	700.02
	Advance	532	324	405.58	8.00	8000.00	609.82	410.71	8.33	9999.00	785.86
Intermediate Education Level	Others	1066	420	333.75	1.67	10833.33	675.23	371.01	8.00	10000.00	844.40
	Intermediate	881	311	318.05	6.67	26000.00	1231.06	233.74	10.00	9999.00	573.37
Economic Sector	Informal	1075	355	303.86	1.67	26000.00	1100.82	248.58	8.33	10000.00	616.10
	Formal	872	376	354.73	8.00	16250.00	770.14	373.07	8.00	9999.00	843.53
Type of Contract	Temporary	372	126	347.90	1.67	26000.00	1622.28	208.35	8.33	3466.67	307.77
	Permanent	1575	605	321.62	8.00	17333.33	731.72	334.33	8.00	10000.00	804.10
Working Time Arrangement	Part Time	584	254	360.27	8.33	26000.00	1290.25	257.45	8.00	4800.00	415.28
	Full Time	1363	477	312.24	1.67	17333.33	788.99	341.98	15.00	10000.00	868.71
Marital Status	Single/Widowed	323	218	235.08	15.00	5000.00	340.49	268.43	10.00	5000.00	509.76
	Married/Union/Cohabiting	1624	513	344.86	1.67	26000.00	1046.88	331.38	8.00	10000.00	823.29

Table A2

Results of robust regression for men; dependent variable: ln (WAGE)

LNWAGE	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
URBAN	.1052399	.0318558	3.30	0.001	.0427647	.1677151
AGE	.0105185	.0016121	6.52	0.000	.0073569	.01368
EDU_ADV	.5629261	.0460982	12.21	0.000	.4725188	.6533334
EDU_INT	.1983892	.0430772	4.61	0.000	.1139068	.2828717
FORMAL_SEC	.1731802	.0326402	5.31	0.000	.1091667	.2371938
PERMANENT	.1288564	.049905	2.58	0.010	.0309833	.2267294
FULL_TIME	.061892	.0375717	1.65	0.100	-.0117932	.1355772
MARRIED	.067806	.0427798	1.58	0.113	-.0160933	.1517054
_cons	4.321599	.0829294	52.11	0.000	4.158958	4.484239

Table A3

Results of robust regression for women; dependent variable: ln (WAGE)

LNWAGE	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
URBAN	.1725299	.0499007	3.46	0.001	.0745622	.2704976
AGE	.0114803	.0027736	4.14	0.000	.006035	.0169257
EDU_ADV	.8260828	.1019186	8.11	0.000	.6259906	1.026175
EDU_INT	.4183352	.1000892	4.18	0.000	.2218346	.6148358
FORMAL_SEC	.2351441	.0506147	4.65	0.000	.1357746	.3345136
PERMANENT	.2085947	.0675204	3.09	0.002	.076035	.3411544
FULL_TIME	.1731837	.0548502	3.16	0.002	.0654986	.2808687
MARRIED	.0488301	.0588021	0.83	0.407	-.0666133	.1642736
_cons	3.765762	.1802905	20.89	0.000	3.411806	4.119719

Table A4

Results of Blinder-Oaxaca Decomposition Analysis; group by SEX.

```
    explained: (X1 - X2) * b1
  unexplained: X2 * (b1 - b2)
```

LNWAGE	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
overall						
group_1	5.336463	.017551	304.05	0.000	5.302064	5.370863
group_2	5.308539	.028908	183.64	0.000	5.25188	5.365197
difference	.0279248	.0338188	0.83	0.409	-.0383587	.0942084
explained	-.0859554	.0154729	-5.56	0.000	-.1162819	-.055629
unexplained	.1138803	.030985	3.68	0.000	.0531507	.1746098
explained						
URBAN	-.0086766	.0034979	-2.48	0.013	-.0155325	-.0018208
AGE	.0238152	.0062214	3.83	0.000	.0116214	.036009
EDU_ADV	-.095253	.0140978	-6.76	0.000	-.1228842	-.0676218
EDU_INT	.0053587	.0043938	1.22	0.223	-.003253	.0139704
FORMAL_SEC	-.0117211	.0044907	-2.61	0.009	-.0205227	-.0029195
PERMANENT	-.0024525	.002312	-1.06	0.289	-.006984	.002079
FULL_TIME	.0029739	.0021102	1.41	0.159	-.001162	.0071099
unexplained						
URBAN	-.0431615	.0423789	-1.02	0.308	-.1262227	.0398996
AGE	-.0228201	.1107103	-0.21	0.837	-.2398084	.1941681
EDU_ADV	-.1201249	.0416478	-2.88	0.004	-.2017531	-.0384968
EDU_INT	-.0955859	.0384564	-2.49	0.013	-.170959	-.0202127
FORMAL_SEC	-.0323866	.0325908	-0.99	0.320	-.0962633	.0314901
PERMANENT	-.066704	.0656983	-1.02	0.310	-.1954702	.0620623
FULL_TIME	-.0714307	.042418	-1.68	0.092	-.1545684	.0117071
_cons	.566094	.1585775	3.57	0.000	.2552879	.8769001

Appendix B

Output of Classical Assumption

Table B1

Normality Assumption Test for OLS Model for Men

Descriptive Statistics

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Unstandardized Residual	1947	.761	.055	9.323	.111
Valid N (listwise)	1947				

Table B2

Normality Assumption Test for OLS Model for Women

Descriptive Statistics

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Unstandardized Residual	731	.796	.090	8.324	.181
Valid N (listwise)	731				

Table B3

Multicollinearity Assumption Test for OLS Model for Men (VIF)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	4.322	.078		55.320	.000		
	Geographical Location	.105	.033	.067	3.179	.002	.949	1.053
	Age	.011	.002	.156	6.727	.000	.786	1.272
	Advanced Education Level	.563	.046	.324	12.291	.000	.608	1.644
	Intermediate Education Level	.198	.040	.128	4.976	.000	.643	1.555
	Economic Sector	.173	.036	.111	4.865	.000	.809	1.237
	Type of Contract	.129	.042	.066	3.067	.002	.929	1.077
	Working Time Arrangement	.062	.035	.037	1.754	.080	.968	1.033
	Marital Status	.068	.046	.033	1.481	.139	.873	1.145

a. Dependent Variable: LnWage

Table B4

Multicollinearity Assumption Test for OLS Model for Women (VIF)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.766	.140		26.911	.000		
	Geographical Location	.173	.055	.105	3.156	.002	.930	1.075
	Age	.011	.002	.159	4.620	.000	.860	1.163
	Advanced Education Level	.826	.082	.527	10.133	.000	.378	2.643
	Intermediate Education Level	.418	.081	.266	5.183	.000	.390	2.566
	Economic Sector	.235	.053	.151	4.468	.000	.897	1.114
	Type of Contract	.209	.067	.101	3.092	.002	.956	1.046
	Working Time Arrangement	.173	.055	.106	3.176	.002	.921	1.086
	Marital Status	.049	.056	.029	.870	.385	.941	1.063

a. Dependent Variable: LnWage

Table B5

Heteroskedasticity Assumption Test for OLS Model for Men

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	80.706	8	10.088	3.746	.000[b]
	Residual	5218.917	1938	2.693		
	Total	5299.624	1946			

a. Dependent Variable: RES_SQR

b. Predictors: (Constant), Marital Status, Geographical Location, Intermediate Education Level, Working Time Arrangement, Type of Contract, Economic Sector, Age, Advanced Education Level

Table B6

Heteroskedasticity Assumption Test for OLS Model for Women

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.265	8	3.283	1.602	.121[b]
	Residual	1479.758	722	2.050		
	Total	1506.024	730			

a. Dependent Variable: RES_SQR

b. Predictors: (Constant), Marital Status, Intermediate Education Level, Working Time Arrangement, Type of Contract, Economic Sector, Geographical Location, Age, Advanced Education Level