

Economic Analysis of Urban Workers' Wage in Iran

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1 Introduction

Understanding the determinants of wages is crucial for policymakers, economists, and researchers. This project aims to investigate the various factors that influence wages among urban households in Iran. By examining these determinants, we can gain insights into how education, experience, gender, and marital status affect earnings. Such an analysis

is vital for formulating effective labor market policies and addressing issues related to economic inequality.

Identifying the key determinants of wages can help in designing policies that promote fair and efficient labor markets. For instance, if education is found to be a significant determinant, policies that enhance access to quality education could be prioritized. Similarly, understanding the impact of gender and marital status on wages can inform policies aimed at reducing gender discrimination and supporting work-life balance.

The theoretical framework for this study is based on the human capital theory, which posits that investments in education and experience enhance an individual's productivity and, consequently, their earning potential (Mincer, 1958). According to this theory, human capital functions as a production input similar to physical capital, directly influencing economic output. Investments in education and health are thus viewed as crucial investments in human capital that yield long-term economic benefits (Schultz, 1960).

This study utilizes data from the Household Expenditure and Income Survey for urban households in 2021 (1400 in the Iranian calendar). By applying Tobit regression analysis, we estimate the effects of education, experience, marital status, and gender on wages among employed individuals in urban households. The findings of this study are expected to provide valuable insights into wage dynamics, inform policy debates, and contribute to strategies aimed at achieving a more equitable labor market.

2 Literature Review

The determinants of wages have been widely studied, with significant focus on factors such as education, experience, gender, and marital status. This section reviews the existing literature to provide a comprehensive understanding of these determinants.

2.1 Education

Education is consistently identified as a critical determinant of wages. According to human capital theory, higher levels of education enhance an individual's skills and productivity, leading to higher wages (Mincer, 1958; Schultz, 1960). Checchi and van De Werfhorst (2018) found a positive relationship between educational attainment and earnings, indicating that individuals with higher education levels tend to earn more. Similarly, Busemeyer (2015) demonstrated that skill inequality, influenced by educational background, significantly affects wage disparities.

2.2 Experience

Work experience is another vital factor influencing wages. Experience increases an individual's skills and efficiency, leading to higher productivity and, consequently, higher wages. Hazans (2005) found that seniority positively impacts earnings, and the longer individuals stay in the workforce, the more they tend to earn. This relationship underscores the importance of accumulated work experience in determining wage levels.

2.3 Gender

Gender remains a significant determinant of wages, with numerous studies highlighting persistent wage gaps between men and women. Mandel (2016) and the International

Labour Organisation (2016) reported that gender pay gaps are prevalent across various sectors and occupations. Factors contributing to this gap include occupational segregation, differences in work experience, and discrimination. In the US, Hegewisch and Williams-Baron (2018) found that women earned only 80.5

2.4 Marital Status

Marital status also plays a role in wage determination. Married individuals often earn more than their unmarried counterparts, potentially due to greater stability and support systems that enhance productivity. Kaplan and Herbst (2015) noted that marital status can influence economic outcomes, including wages. Their study in Israel showed that married couples, particularly those with higher education levels, tend to have higher earnings.

2.5 Intersection of Determinants

The interaction between these determinants can further complicate wage dynamics. For example, gender and marital status can interact to influence wages differently for men and women. In Nigeria, studies have shown that educational disparities due to cultural and economic factors significantly affect women's earnings compared to men (Akinbi and Akinbi, 2015). These intersections highlight the complexity of wage determinants and the need for multifaceted policy approaches.

In summary, education, experience, gender, and marital status are significant determinants of wages. Understanding these factors is crucial for designing effective policies aimed at promoting fair and equitable labor markets. By addressing disparities in education and experience and tackling gender-based wage gaps, policymakers can enhance economic outcomes for all workers.

3 Data

In this research, data from the Household Expenditure and Income Survey for urban households in the year 2021 (1400 in the Iranian calendar) has been used. To estimate the impact of various factors on individuals' wages, the population under study consists of employed individuals, with a sample size of 12,399 people. The average wage, salary, and benefits of individuals in this sample amount to 452 million Rials per year. Regarding the experience variable, since there is no direct question in the Household Expenditure and Income Survey, a proxy variable was used, which is explained in detail in the results section. The average working experience estimated by this proxy variable is 21.7 years in the studied sample. As shown in Figure 1, women constitute a small share of the labor force in urban households, with only 2 million women working in urban households compared to 10 million men, even though the population of men and women in urban households is nearly equal.

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4 Methodology

4.1 Tobit Regression Model

The Tobit regression model, also known as the censored regression model, is utilized when the dependent variable is either censored or truncated. In this study, the Tobit model is appropriate due to the nature of wage data, which is often subject to a lower limit (i.e., zero). Traditional linear regression models, such as OLS, may yield biased and inconsistent estimates when applied to censored data. The Tobit model addresses this issue by accounting for the censoring mechanism within the estimation process, thus providing more accurate parameter estimates.

The Tobit model is specified as follows:

$$\text{Wage}_i^* = \alpha_0 + \alpha_1 \text{edu}_i + \alpha_2 \text{exper}_i + \alpha_3 \text{exper2}_i + \alpha_4 \text{marr}_i + \alpha_5 \text{gender}_i + u_i$$

where Wage_i^* is the latent variable representing the true wage of individual i . The observed wage (Wage_i) is:

$$\text{Wage}_i = \begin{cases} \text{Wage}_i^* & \text{if } \text{Wage}_i^* > 0 \\ 0 & \text{if } \text{Wage}_i^* \leq 0 \end{cases}$$

Here, $u_i \sim N(0, \sigma^2)$ is the error term assumed to be normally distributed with mean zero and constant variance σ^2 .

4.2 Model Specification

The model aims to estimate the determinants of wages among individuals in the dataset. The specification of the Tobit model used in this study is:

$$\ln(\text{Wage}_i) = \alpha_0 + \alpha_1 \text{edu}_i + \alpha_2 \text{exper}_i + \alpha_3 \text{exper2}_i + \alpha_4 \text{marr}_i + \alpha_5 \text{gender}_i + u_i$$

where:

- $\ln(\text{Wage}_i)$ is the natural logarithm of the observed wage of individual i .
- edu_i represents the years of education completed by individual i .
- exper_i denotes the work experience of individual i .
- exper2_i is the square of the work experience, included to capture potential nonlinear effects of experience on wages.
- marr_i is a binary variable indicating the marital status of individual i (1 if married, 0 otherwise).
- gender_i is a binary variable indicating the gender of individual i (1 if male, 0 if female).
- u_i is the error term.

The choice of variables is guided by human capital theory, which suggests that education and experience are key determinants of earnings. Additionally, gender and marital status are included to account for potential demographic influences on wages.

The coefficients α_1 to α_5 provide insights into the relationship between each explanatory variable and the dependent variable. For instance, α_1 measures the percentage change in the wage for each additional year of education, holding other factors constant.

The Tobit model is estimated using the maximum likelihood estimation (MLE) method, which maximizes the likelihood function of the censored sample. This approach ensures efficient and unbiased estimates of the parameters in the presence of censored data.

5 Results

5.1 Descriptive Statistics

In this section, we present the descriptive statistics of the main variables used in our analysis. Table 1 summarizes the mean, standard deviation, minimum, and maximum values for wage, age, education years, and experience.

	Mean	Std. Dev.	Min	Max
Wage	6.62e+08	4.38e+08	0	1.44e+10
Age	39.06	10.89	9	89
Education Years	10.97	4.89	0	23
Experience	22.08	12.91	-4	83

Table 1: Summary Statistics

From Table 1, we observe that the average wage is approximately 662 million Rials with a substantial standard deviation, indicating significant variability in wages. The average age of the individuals in the sample is about 39 years, and they have an average of approximately 11 years of education. The average experience is around 22 years, but the minimum and maximum values indicate a wide range, including some negative values which could be due to data entry errors or outliers.

Figures 1 to 4 provide visual representations of the gender composition, literacy status, marital status, and the distribution of education years in the sample.

5.2 Regression Analysis

In this section, we present the results of the Tobit regression analysis, which examines the determinants of wages. The Tobit model accounts for the censored nature of wage data, where wages are bound at zero. Table 2 summarizes the estimated coefficients and their standard errors.

5.3 Interpretation of Results

The Tobit regression results indicate that several factors significantly influence wages:

- **Education Years:** The coefficient of 0.0675 implies that each additional year of education is associated with a 6.75% increase in the natural logarithm of wages,

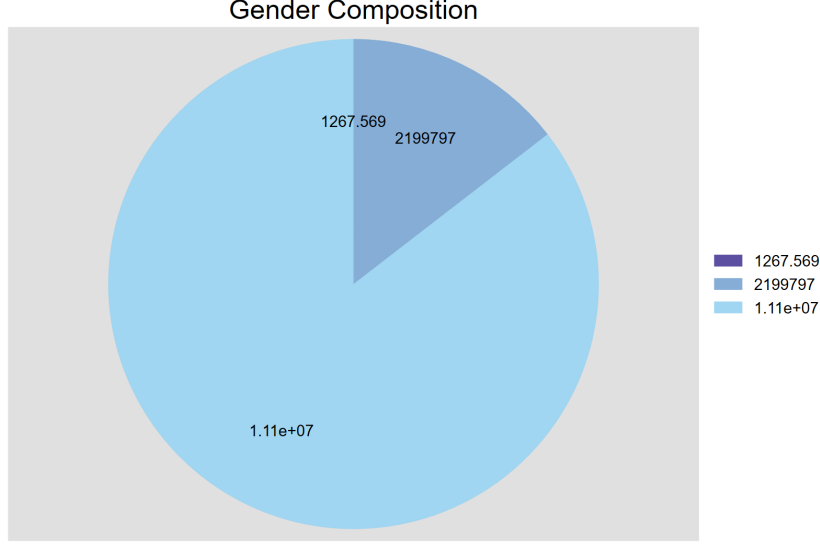


Figure 1: Gender Composition

	Coefficient	Std. Error
Education Years	0.0675	(0.0023)
Experience	0.0391	(0.0015)
Experience Squared	-0.0005	(0.0001)
Marital Status	0.2542	(0.0275)
Gender	0.3076	(0.0256)
Constant	18.3618	(0.1175)
<i>Variance of Residuals</i>		
var(e.ln_wage)	0.4942	(0.0123)

Table 2: Tobit Regression Results

holding other factors constant. This is consistent with human capital theory, which posits that education enhances an individual's productivity and earning potential.

- **Experience:** The positive coefficient for experience (0.0391) suggests that additional years of work experience are associated with higher wages. However, the negative coefficient for experience squared (-0.0005) indicates diminishing returns to experience. Initially, wages increase with experience, but the rate of increase slows down over time.
- **Marital Status:** Being married is associated with a 25.42% higher log wage compared to unmarried individuals, possibly due to greater household stability and support.
- **Gender:** The coefficient for gender (0.3076) indicates that males earn approximately 30.76% more than females, highlighting a significant gender wage gap.
- **Constant Term:** The constant term (18.3618) represents the expected log wage when all explanatory variables are zero.

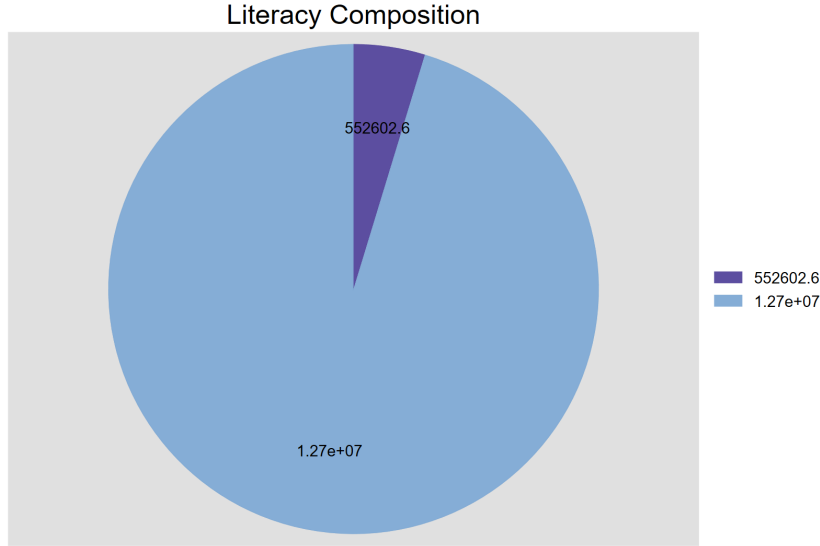


Figure 2: Literacy Composition

5.4 Diagnostic Plots:

Figures 5 to 7 provide diagnostic plots to assess the model's performance.

The residuals vs. fitted values plot (Figure 5) shows no clear pattern, suggesting that the model's assumptions about the error term may be reasonable.

The Q-Q plot (Figure 6) suggests that the residuals are approximately normally distributed.

The scatter plot of predicted vs. actual log wages (Figure 7) indicates a strong linear relationship, further validating the model's fit.

5.5 Additional Visualizations

Figures 8 to 12 provide additional insights into the relationship between $\ln(\text{wage})$ and key variables.

These plots provide further insights into how education and experience affect wages, demonstrating the positive relationships and diminishing returns.

6 Conclusion

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7 Conclusion

This study has aimed to identify and analyze the key determinants of wages among urban households in Iran using a Tobit regression model. The Tobit model was particularly suitable due to the censored nature of wage data, ensuring more accurate and unbiased estimates.

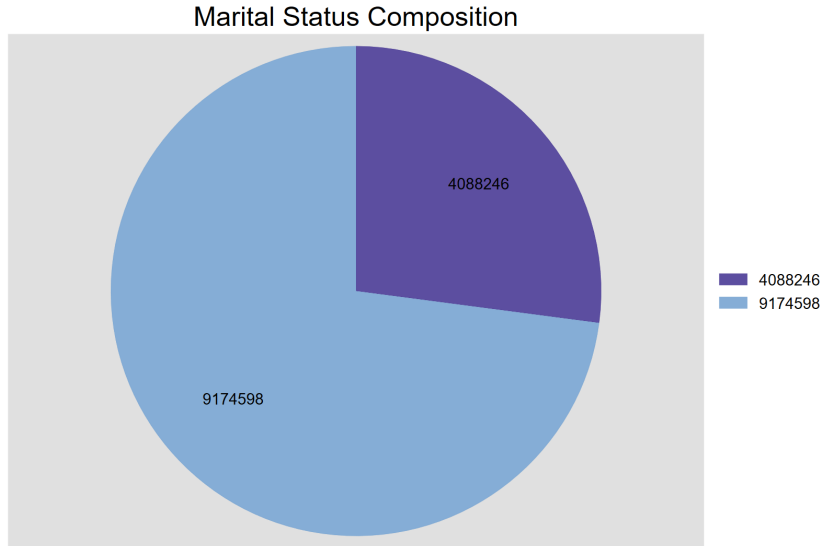


Figure 3: Marital Status Composition

7.1 Key Findings

- **Education:** The analysis reveals that education plays a significant role in determining wages. Each additional year of education is associated with a 6.75% increase in the natural logarithm of wages. This finding underscores the importance of investing in education to enhance individual earning potential and reduce wage disparities.
- **Experience:** Work experience is another crucial determinant of wages. The results indicate that wages initially increase with experience, but the rate of increase diminishes over time. This suggests that while gaining experience is valuable, its incremental benefits reduce as individuals accumulate more years in the workforce.
- **Marital Status:** The positive impact of being married on wages suggests that marital stability may contribute to higher productivity and earning capacity. Married individuals earn approximately 25.42% more than their unmarried counterparts.
- **Gender:** The significant gender wage gap revealed by the study highlights a critical issue. Males earn approximately 30.76% more than females, suggesting the presence of gender-based wage discrimination in the labor market.

7.2 Policy Implications

The findings of this study have important policy implications. Policies aimed at increasing access to education and improving its quality could help in raising wages and reducing income inequality. Additionally, measures to support lifelong learning and skill development could mitigate the diminishing returns to experience observed in the study.

Addressing the gender wage gap requires targeted interventions to eliminate discriminatory practices and promote gender equality in the workplace. Ensuring that married individuals have access to supportive work-life balance policies could further enhance their productivity and earnings.

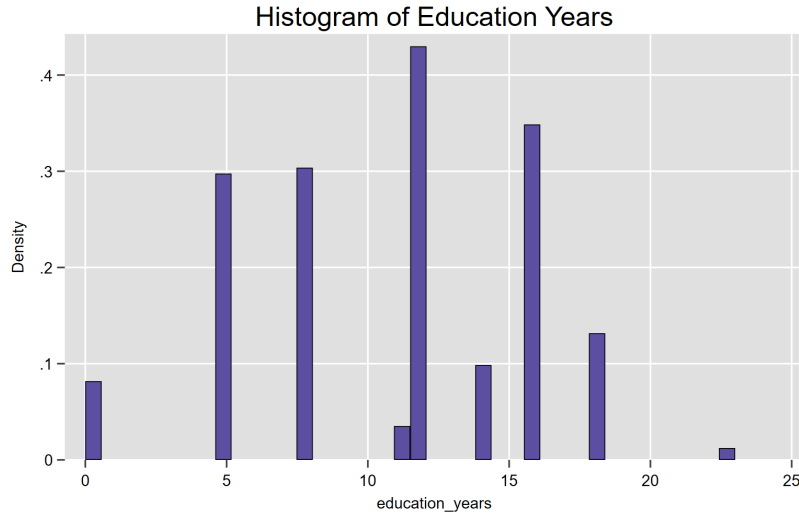


Figure 4: Histogram of Education Years

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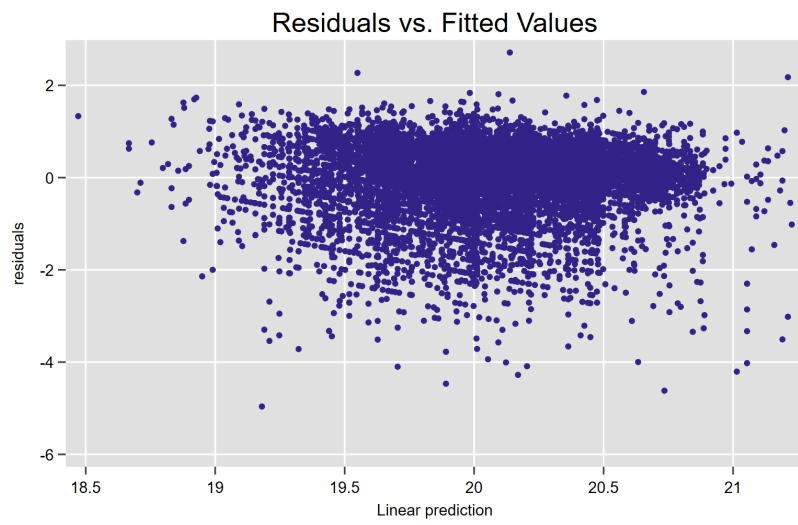


Figure 5: Residuals vs. Fitted Values

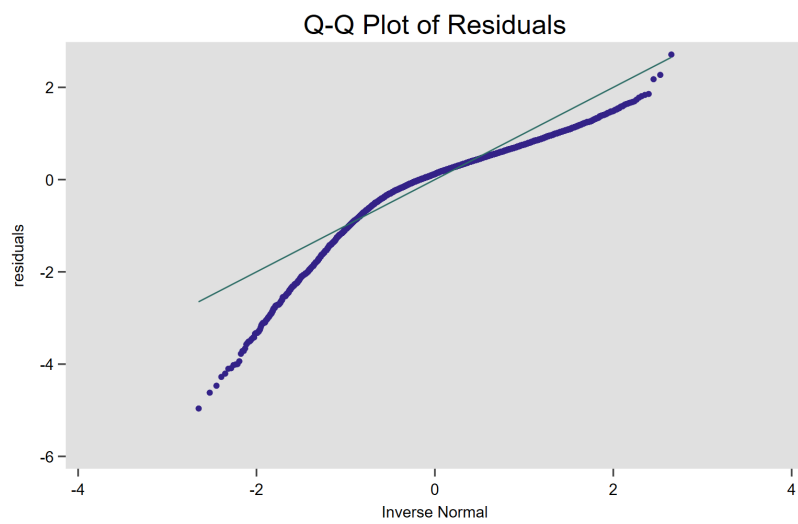


Figure 6: Q-Q Plot of Residuals

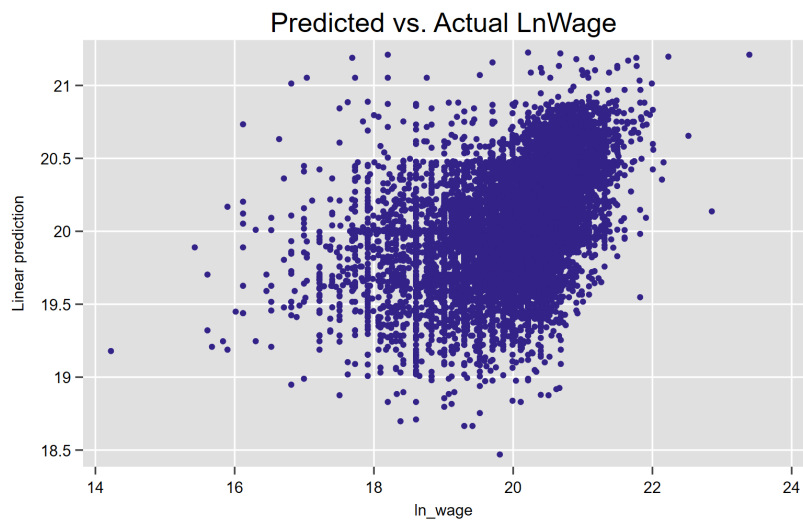


Figure 7: Predicted vs. Actual LnWage

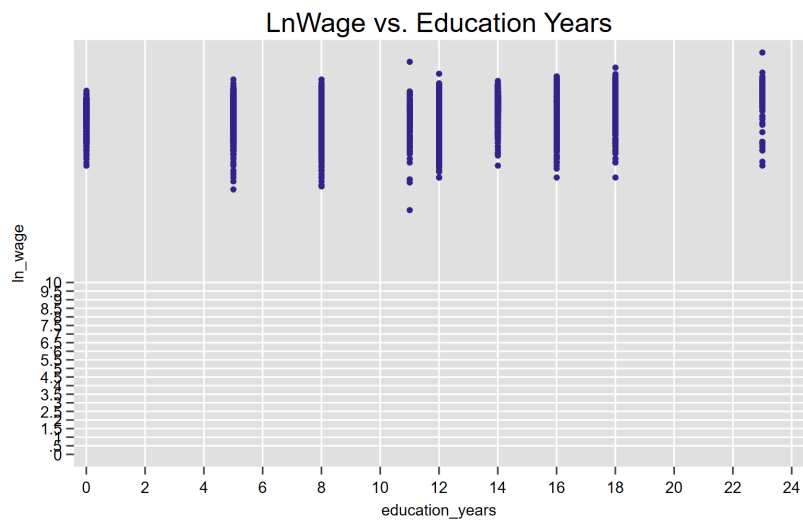


Figure 8: LnWage vs. Education Years

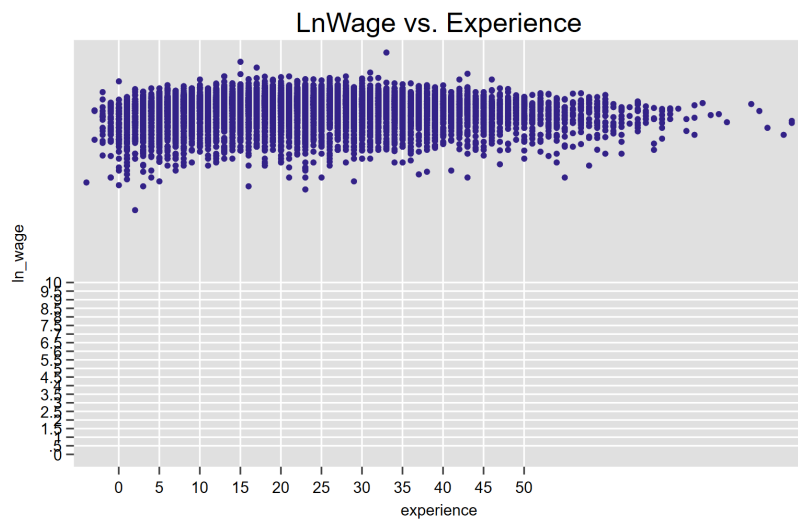


Figure 9: LnWage vs. Experience

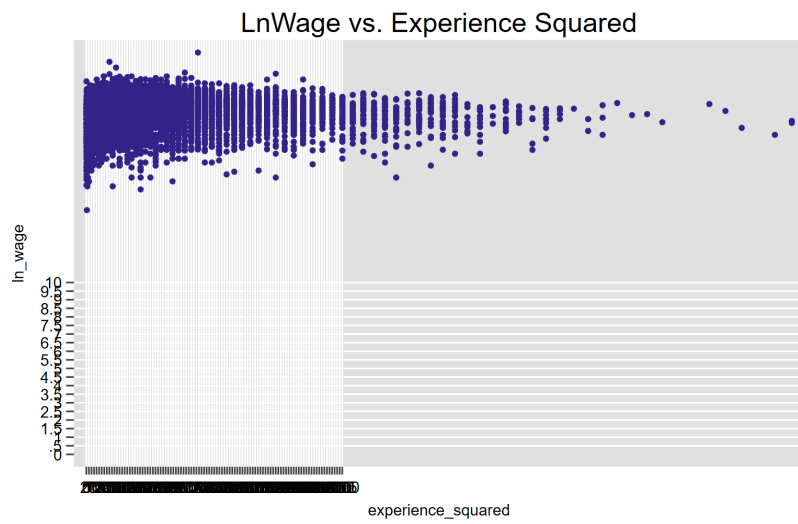


Figure 10: LnWage vs. Experience Squared

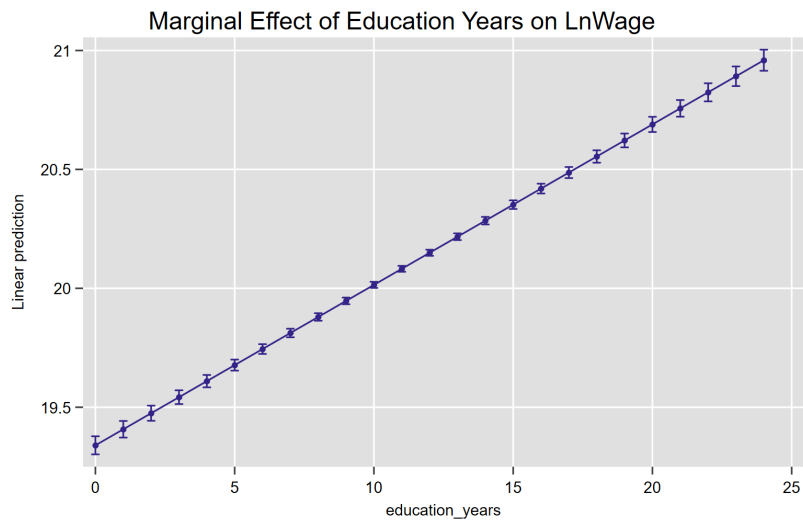


Figure 11: Marginal Effect of Education Years on LnWage

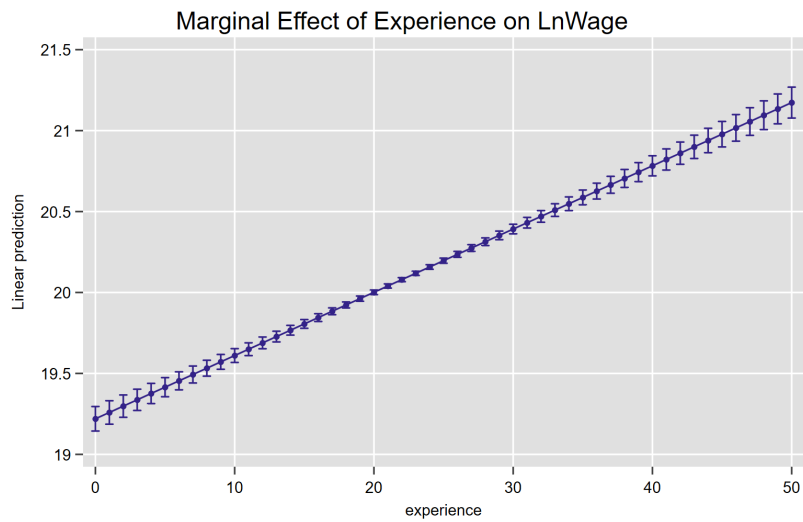


Figure 12: Marginal Effect of Experience on LnWage