

THE CORRELATION BETWEEN GENDER PAY GAP AND GDP GROWTH IN AZERBAIJAN ECONOMY

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ABSTRACT

The gender wage gap is described as phenomenon such that women with same capacity, productivity with male workers are paid or promoted less. The reasons for such discrimination are the cultural stereotypes, personal biases, and labor cost saving. Recent statistics shows that Azerbaijan is also among the countries which suffer from this phenomenon where it ranked 100th out of 156 countries in The Global Gender Gap Index (GGGI). Yet, State Statistics Committee of the Republic of Azerbaijan has positive views in this topic, which claims that the economic growth in the country is followed by the increase in the part of women in country's labor force. In this regard, extensive empirical analysis developed to test these ideas where the difference between average wages of female and male workers regressed on GDP (Gross Domestic Product) per capita. Additionally, literacy ratio of males to females and Gini coefficient were used as control variables. The results confirmed the hypothesis by showing a negative relationship between the gender wage gap and economic development so, we believe that the results of the study will be useful for the implementation of correct government policies, which will be aimed at reducing the gender pay gap in the future.

Keywords: gender wage gap, gross domestics product, per capita, Gini coefficient, literacy rate

JEL Classification: J7

INTRODUCTION

“Freedom cannot be achieved unless women have been emancipated from all kinds of oppression” (Mandela, 2004).

As Nelson Mandela emphasized women have been faced oppression all over the centuries. The history shows that the role of a woman in the society has been described as a servant for her husband and children. However, starting from 20th century we observe rise in women empowerment. In this period women up-risings reached in high levels such as feminism movements in 1950's, Mothers of the Plaza de Mayo in 1970's and so on.

Because of those movements today women became one of the major part worlds of business, politics, science, art and other fields, they have reached high levels in career levels so, we can see female CEO's, entrepreneurs, scientists, politicians and so on. However, despite all these revolutions, unfortunately, there still exists a degree of gender inequality in the labor market and a considerable wage gap across the world. The gender wage gap is described as phenomenon such that women with same capacity, productivity with male workers are paid or promoted less because of their gender. The reason for such discrimination is various: there is hard stereotypes developed in different cultures that women are incapable to work in some areas because of being weak or emotional; there is also some personal bias by employers against female workers; and sometimes, employers this phenomenon to cost saving purposes. Thus, recent data figures show that there are huge gaps between earnings of male and female employees across the different sectors. The Global Gender Pay Gap Report (2021) calculates that there needs 135.6 years to close the wage gap between genders.

The degree of gender discrimination in labor force can be various in different countries, sectors, and position; this can be in the process of job offering, promotion or even project-duty handling. Additionally, the gender discrimination can be going into deeper whereas women face some materialism, objectivism, and verbal sometimes physical harassments. Another problem is that due to low earnings, women are able to consume, save and invest less, which led to either poverty of alone women or the dependent of them from other people.

According to Pignatti (2016), in the Soviet Union women participation rate in labor force was high and they were earning almost same as men as among the middle class. The main reasons for this phenomenon were a few: firstly, the rebellions of female workers during Russian Revolution, secondly government planned to encourage workers and thirdly to create so called perfect country ideology. However, after the collapse of the USSR the socialism philosophy altered by capitalism in all new countries where the gender balance in labor market also changed. In this regard, as a post-soviet country, we investigated Azerbaijan labor market to see how the gender equilibrium has become. Unfortunately, the data analysis is not quite optimistic. Recently, The Global Gender Pay Gap report (2021) ranked the countries based on The Global Gender Gap Index (GGGI) and unfortunately Azerbaijan is 100th out of 156 countries. The statistics also show that while women generate half of the labor force in Azerbaijan, they only earn 48% of men's income. In addition, the report of State Committee on Women's Problems of the Republic of Azerbaijan (2005) claims that employers who want to decrease staff expenses divide candidates into two parts and offer different level of wages for men and women employees.

Thus, considering that gender equality in the labor market is an important issue from both the perspective of economic development and human rights, the issue requires extensive theoretical and empirical analysis to be able to develop qualitative policy recommendations for Azerbaijani government to overcome this issue.

In this regard, we refer the views of the State Statistics Committee of the Republic of Azerbaijan which claims that the economic growth in the country is followed by the increase in the share of women in employment. Therefore, the research proposed in this paper will aim to analyze how the economic development affects the pattern of gender pay gap in Azerbaijan. The main hypothesis of the paper is that as Statics Committee mentioned there is negative correlation between gender wage gap and economic growth. During the analysis of the hypothesis, a regression model will be developed where the dependent variable will difference between average wages of female and male workers whereas main independent variable will GDP (Gross Domestic Product) per capita of the country, additionally there will be several control variables such as Gini (inequality) coefficient and literacy rate.

LITERATURE REVIEW

Gender inequality reveals itself in different fields of modern society such as business world, family life and so on. Yet, in this literature we will investigate particularly how this type of discriminative behaviors affects women's earnings and career planning. Additionally, we will also explore the correlation between gender inequality in labor market and economic growth and possible analysis methods to seek solutions for the problem.

The facts support the idea that there is considerable gender pay gap in the Azerbaijan economy. For instance, Klarven (2020) found that almost half of the labor force in Azerbaijan consists of women whereas in some industries the share of women employees is more than that of male employees. Yet approximately 50% of women workers in Azerbaijan work in the bottom of the labor market with comparably lower level of wage. Although Klarven stated these facts by supporting relevant data, Karimova (2020) went to deeper to investigate the roots of this gender inequality in Azerbaijan. In this regard she conducted research in the education industry by including around 15 control variables such as gender, religion, marital status, foreign language skills, education levels and so on. She found the main reasons for gap between the earning of two genders are social and religious aspects, which affects women's career options, promotion and even selection to the vacancy.

However, there are also optimistic updates where several articles conclude that economic growth can defeat gender discrimination in the labor market of the country.

For example, it was claimed by Eastin and Prakash (2013) that economic growth is likely to decrease gender inequality in the economy because of the enabling of women to participate in labor market more. Additionally, Derlacz (2013) also support them by analyzing the relationship between the gender pay gap and productivity development for 18 OECD (Organization for Economic Co-operation Development) countries. In the research, he divided labor force into six groups: based on gender: male and female, and based on skill levels: low, medium, and high.

Gender pays differences' comparison was referred on their ability levels to decide on how entire production was altered by male and female employees, and their different skill levels. The results of the analysis, it is shown that raise in the gender wage inequality in all skill levels causes small level of economic growth. The reason is that higher variations in wages discourages females from involving in the labor market, therefore, women's productivity declines which leads to decrease in economic growth. Additionally, if female employees are paid lower number of wages, then it also leads to decline in the capital per worker, as a result, slowdown of economic development appears. Therefore, decreasing gender wage gap can result in increase of females' labor participation, and long-term economic growth.

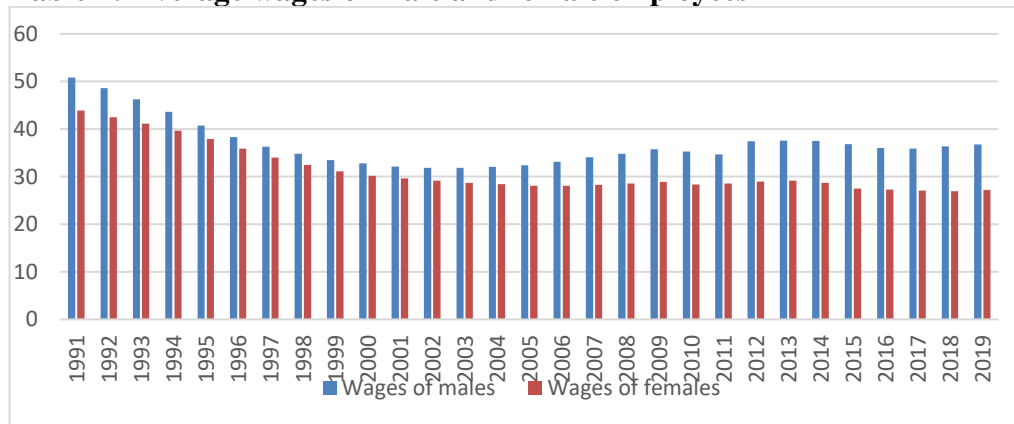
Yet there are also some controversial ideas whether economic growth decrease or increase wage inequality. When Schober and Ebmer (2011) analyzed economies of export-oriented semi-industrialized countries like Azerbaijan, their literature revealed different conclusions. While the previous research concludes positive correlation between gender-based wage discrimination and economic growth meaning gender-based wage discrimination and economic growth move in the same direction for export-oriented countries, Schober and Ebmer showed that relation is negative, and they move in the opposite directions for even export-oriented economies. Nevertheless, Haas (2006) could actually explain this opposite finding by studying the correlation between GDPs per capita and the ratio of annual wages of men and women labor forces. His outcomes showed an interesting finding: the correlation between GDPs per capita and the degree of the gender pay gap was positive, however, relationship was negative when GDP per capita was squared. In other words, when there is an increase in economic growth, the amount of the gender pay inequality rises, however, when there is excessive rates of GDP per capita, economic growth causes reduction in the gender pay inequality, which indicates the Kuznets curve. Unfortunately, the literature also claims that there exists gender pay gap in Azerbaijan economy. Additionally, there are also statements about correlation between wage inequality and economic growth. Yet whether this relation is positive or negative is still a question needs to be investigated in further research.

Data

In our paper we analysis the roots of gender pay gap particularly which variables affect the wage gap and what is magnitude. Thus, in this regard we constructed time series data set for Azerbaijan for the period 1991-2020 years.

The dependent variable of the research is wage ratio of male to female. The variable is obtained by dividing male wages to female wages. Both male and female wages are real variables and shown as percentage of total male and female employment respectively. The data is provided by World Bank's World Development Indicators database (Table 1).

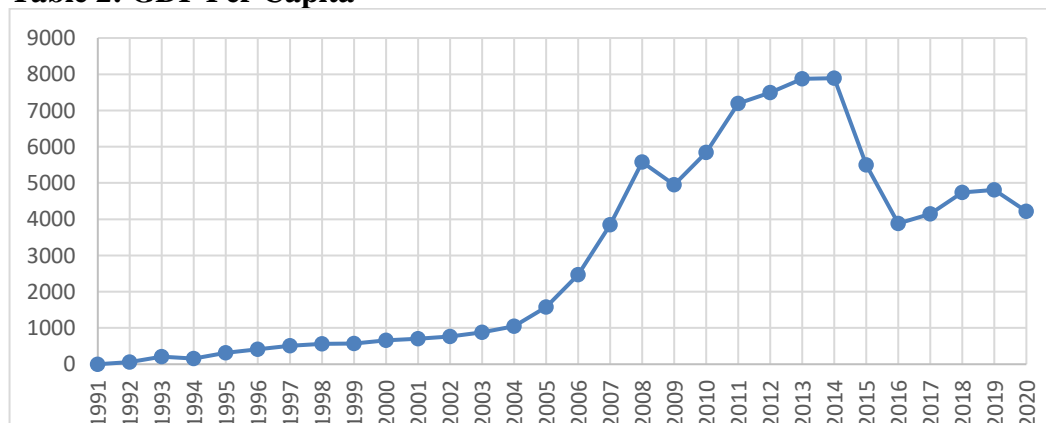
Table 1: Average wages of male and female employees



Source: World Bank Database, 2019

The main independent variable of our regression analysis is GDP per capita. The data is constructed by taking real GDP (Gross Domestic Product) with 2010 USD prices (inflation free) and dividing population of corresponding year. The source of the data is again World Bank's World Development Indicators database. (Table 2).

Table 2: GDP Per Capita



Source: World Bank Database, 2020

In the paper, we also used some control independent variable for against bias or other problems. The first control variable is literacy ratio of males to females. This number is acquired by dividing one variable to another. First is primary school completion rate for males as percentage of male population in given year and the second is female primary school completion rate as percentage of total female population. The data is obtained from The State Statistical Committee of the Republic of Azerbaijan, MDG indicators of the Republic of Azerbaijan.

The last variable Gini Index for Azerbaijan. Gini coefficient is discovered by Italian statistician Corrado Gini in 1912. The index is used to measure income distribution in the given society so, the number shows inequality rate in the country. The graphical representation of coefficient is demonstrated by the help of Lorenz curve where flatter curve means more inequality. The coefficient varies among 0 and 100% or 0 and 1. While 0 presents perfect equality, 1 shows perfect inequality so, high coefficient means high inequal distribution of income (Westfall, 2020). In our analysis, we get Gini Coefficient from Trading Economics which also refer to World Bank estimations. However, our data regarding Gini coefficient suffers from missing data which might affect the results.

Additionally, for our main variables we added literacy rate gap for adult population to look correlation between wage gap and them separately, which again is provided by World Bank's World Development Indicators database.

METHODOLOGY

For the regression analysis we referred to the methodology conducted by Sherri Haas (2006) but with some modifications. The regression equation and explanation of variable are given below:

$$wage = \beta_0 + \beta_1 lgdp + \beta_2 literacy + \beta_3 gini + \beta_4 year + u$$

Table 3: Explanation of variables

Variables	Explanation
wage	wage ratio of male and female workers
year	1991-2020
literacy	literacy rate of male to female population
lgdp	logarithm of real GDP per capita
gini	gini (inequality)coefficient

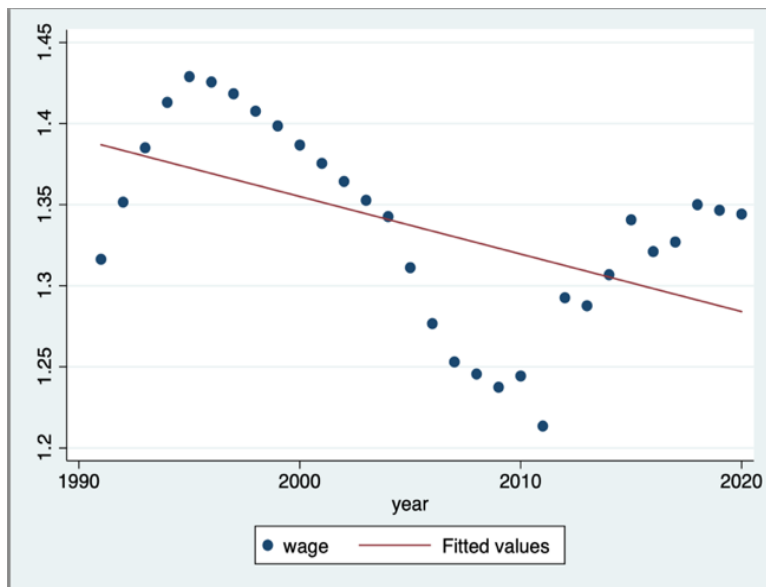
Source: The author

In the original regression, GDP per capita is used solely however, in our model we preferred logarithmic transformation of GDP per capita. There are several reasons for this change. First, as a number GDP per capita is huge compared to other variables so we could not get reasonable coefficient in that way. The second as most importantly, GDP per capita is highly skewed for Azerbaijan since we think high economic growth over the past thirty years, so we need to normalize data. Moreover, change of GDP per capita is more important rather than GDP per capita itself. Another reason for the logarithmic transformation is to decrease heteroskedasticity (non-constant error term) problem.

Moreover, we tried to add unemployment rate ratio for male to female into our regression but in that case, our explanatory variables became insignificant there happened multicollinearity problem which might cause bias problem, so we had to drop unemployment ratio variable.

During our analysis, we discovered that some of our variables such dependent variable wage ratio of male to female have trending issue, which is common for timeseries analysis (See Table 4). The main issue of trending is that sometimes variables show trends in same or opposite directions where it misleads coefficient and cause to think there might be relationship between them. The trending can be linear or growth level. Yet even if trending is not observable, for the safety it is advisable to add time variable into regression model to eliminate any trending related problems (Wooldridge, 2012, p.363-364).

Table 4: Trend analysis



Source: The results are obtained through the author’s analysis

The one of the main issues for all types of OLS (Ordinary Least Square) estimators is multicollinearity where independent variables are correlated in high level. This problem may cause some bias estimation. For checking this problem, we look VIF (Variable Inflation Factor) score of our variables. For this test, results of our control variables are less than five which is quite satisfactory (see Table 5).

Table 5: Collinearity analysis

```
. collin literacy lgdp gini
(obs=23)
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Collinearity Diagnostics

Variable	VIF	SQRT VIF	Tolerance	R- Squared
literacy	1.73	1.32	0.5764	0.4236
lgdp	2.38	1.54	0.4194	0.5806
gini	1.72	1.31	0.5820	0.4180

Mean VIF **1.95**

	Eigenval	Cond Index
1	3.8972	1.0000
2	0.1008	6.2188
3	0.0021	43.4955

Source: The results are obtained through the author’s analysis

The last test we wanted to check is homoskedasticity. Homoskedasticity means error term of the regression - u has same variances for all values of independent variables, the reverse situation is called heteroskedasticity which is violation of assumptions of Gauss-Markov Theorem-best linear unbiased estimator (Wooldridge, 2012). However, heteroskedasticity is not an important issue for time series analysis yet we wanted to check. Therefore, we referred to the White Test where null hypothesis is homoskedasticity and we failed to reject homoskedasticity so there is no heteroskedasticity (see Table 6).

Table 6: Heteroskedasticity Test

```
. estat imtest, white
```

White's test for Ho: homoskedasticity
against Ha: unrestricted heteroskedasticity

chi2(14) = **19.92**
Prob > chi2 = **0.1325**

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	19.92	14	0.1325
Skewness	11.55	4	0.0210
Kurtosis	3.22	1	0.0728
Total	34.69	19	0.0152

Source: The results are obtained through the author’s analysis

RESULTS

The key issue of this paper is the role of gender pay disparity in economic development. The first step in our study is to analyze the properties of time series variables to avoid a false setback. The results of the OLS regression analysis provide preliminary support for the hypothesis. All ratios had a sign predicted by the literature. From our result (Table 7) you can see the effect of our independent and control variables to our dependent variable - wage ratio of male to female. The regression gives us the conclusion that GDP (Gross Domestic Production) per capita and Gini Index for Azerbaijan variables are statistically significant. However, the variable, literacy ratio of males to females is statistically insignificant. More openly, if you change Gini by one, we expect wage ratio to change by 0.103. Moreover, if we increase GDP by one percent, we can see wage ratio to decrease by 0.02 units. About the literacy, if we increase it by 1 point, wage ratio will decrease by 1.61. We see that literacy and GDP is negatively correlated and Gini is positively. The coefficient in front of real GDP is negative and highly significant as expected as GDP increased wage gap will decrease. Furthermore, our R squared result is quite well. 90 percent R square means that our control variables can explain our independent variables by 90 percent, which show the right choice of independent variable for this regression model (see Table 7 below).

Table 7: Results of regression analysis

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. reg wage year literacy lgdp gini
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Source	SS	df	MS	Number of obs	=	23
Model	.09140169	4	.022850422	F(4, 18)	=	42.79
Residual	.009612943	18	.000534052	Prob > F	=	0.0000
				R-squared	=	0.9048
				Adj R-squared	=	0.8837
Total	.101014633	22	.004591574	Root MSE	=	.02311

wage	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
year	.0081297	.0027916	2.91	0.009	.0022649 .0139946
literacy	-1.611775	8.643761	-0.19	0.854	-19.77164 16.54809
lgdp	-.1917116	.0282372	-6.79	0.000	-.2510358 -.1323874
gini	.1030558	.0507823	2.03	0.057	-.0036339 .2097454
_cons	-11.69036	10.25104	-1.14	0.269	-33.22698 9.846273

Source: The results are obtained through the author’s analysis

CONCLUSION

To summarize, when we looked at the literature, we saw that there is lack of the effective government policy to decrease the gender wage gap. Thus, as was mentioned in the beginning of the paper the aim of the research paper was to find out the effect of economic growth on gender pay gap in Azerbaijan. From the conducted research it is concluded that the hypothesis of negative relationship between the economic growth, namely GDP of Azerbaijan and gender pay gap, namely wage ratio of males to females, turned to be true.

Moreover, there is negative effect of literacy rate of male to female population and positive effect of log of real GDP per capita on wage ratio. However, during the analysis we also faced some limitations. The first one was regarding the literacy rate. In the regression, we used primary school completion rate for gender to control literacy gap which was a proxy variable since the data on male and female adult literacy rate which should be used, was not sufficient due to small sample size. The other limitations were small sample size due to unavailability of data in databanks, some missing data or gaps in the data, possible omitted variables, and lack of investigation in the gender pay gap field for Azerbaijan case. Moreover, there was also another limitation Yet despite these implications, we believe that the results of the study will be useful for the implementation of correct government policies, which will be aimed at reducing the gender pay gap in the future.

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