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THESIS

GENDER WAGE GAP AND INTERNATIONAL TRADE: EVIDENCE FROM TURKEY'S MANUFACTURING SECTOR

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APPROVAL PAGE

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Arts in Economics

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ABSTRACT

GENDER WAGE GAP AND INTERNATIONAL TRADE: EVIDENCE FROM TURKEY'S MANUFACTURING SECTOR

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MA in Economics

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Gender wage gap is a widely discussed issue in labor economics. This paper contributes to the literature on three fronts. First, the overall gender wage gap present in Turkey's manufacturing sector is analyzed using updated data from the years 2006, 2010, and 2014. Next, the effect of international trade on the gender wage gap is investigated. We first decompose the overall gender wage gap to its explained and unexplained components using the Blinder-Oaxaca decomposition method. Afterward, we use both the Blinder-Oaxaca decomposition and OLS regression to compare the gender wage gap in the tradable and non-tradable sectors. Then each year is decomposed separately to analyze the gender wage gap over time. Our results show that there is a gender wage gap of 2.6% in Turkey's manufacturing sector due to discrimination. In addition, the regression results reveal that the gender wage gap in the tradable sectors is 3.3%, while in the non-tradable sectors it is 1.9%. The decomposition results show the gender wage gap in the tradable sectors to be 4.2%, while in the non-tradable sectors, it is 3.2%. Lastly, there has been an increase of the gender wage gap from 2006 to 2014. We conclude that, in contradiction to Becker's theory, the gender wage gap in Turkey's manufacturing sector is higher in the tradable sectors than in the non-tradable sectors.

Keywords: Gender Wage Gap, International Trade, Turkey

ÖZ

İKİ CİNSİYET ARASINDAKİ MAAŞ AYRIMI VE ULUSLARARASI TİCARET: TÜRKİYE'NİN ÜRETİM SEKTÖRÜNDEN SONUÇ

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İşçi ekonomisinde, iki cinsiyet arasındaki maaş ayrımı geniş ölçüde bir bahis konusu olmak durumundadır. Bu makale, literatüre üç farklı cepheden katkı sağlamakta. İlk olarak, Türkiye'deki üretim sektöründeki mevcut genel iki cinsiyet arasındaki maaş ayrımı; 2006, 2010, 2014 yıllarından güncellenmiş veri kullanılarak analiz edilmektedir. Bunun yanı sıra, uluslararası ticaretin maaş ayrımına olan etkisi de ele alınmaktadır. Blinder-Oaxaca ayrıştırma metodunu kullanrak, genel iki cinsiyet arasındaki maaş ayrımın açıklanmış ve açıklanmamış bileşenlerine ayrıştırmakla başlamaktayız. Daha sonrasında, Blinder-Oaxaca ayrıştırma metodu ile birlikte OLS gerileme metodunu kullanrak, ticaretin yer alabildiği ve alamadığı sektörlerdeki maaş ayrımını karşılaştırıyoruz. Ondan sonra, iki cinsiyet arasındaki maaş ayrımın zamanla değişimini (var ise) analiz etmek için, her yıl ayrı ayrı dekompoze edilmekte. Sonuçlarımız, Türkiye'deki üretim sektöründe ayrımcılıktan dolayı 2.6% maaş farkı bulunduğunu göstermektedir. Bunun yanı sıra, gerileme sonuçları; maaş ayrımının ticaretin yer alabildiği sektörlerde 3.3%, fakat ticaretin yer alamadığı sektörlerde 1.9% olduğunu göstermektedir. Son olarak da, 2006 yılından 2014 yılına kadar, iki cinsiyet arasındaki maaş ayrımında bir yükselmenin yaşanması söz konusudur.Sonuç olarak; Becker teorisine karşıt, Türkiye üretim sektörü içindeki ticaretin yer alabildiği sektörlerin, ticaretin yer alamadığı sektörlere göre daha fazla maaş ayrımına yer verdiğini görmekteyiz.

Anahtar Kelimler: İki cinsiyet arasındaki maaş ayrımı; uluslararası ticaret; Türkiye

DEDICATION

This thesis is dedicated to my parents.

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Sarah Musazay

ISTANBUL, 2019

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LIST OF SYMBOLS AND ABBREVIATIONS

Explanation of Abbreviations:

CPA	Collective pay agreement
GWG	Gender wage gap
ILO	International Labour Organization
NAFTA	North American Free Trade Agreement
OLS	Ordinary Least Squares
SES	Structure of Earnings Survey
TURKSTAT	Turkish Statistical Institute

Explanation of Symbols:

β_{0f}	intercept for female wage equation
β_{1f}	observable female worker characteristic
β_{0m}	intercept for male wage equation
β_{1m}	observable male worker characteristic
C	gap attributable to coefficients
CE	gap attributable to the interaction of endowments and coefficients
D	matrix of weights
d	discrimination coefficient
E	gap attributable to endowments
G_0	differences in the intercepts
G_1	differences in coefficients and endowments
I	identity matrix
w_m	men’s wage
w_f	women’s wage
w*	market wage
Y_f	average wage for female workers

Y_m	average wage for male workers
w_m^{nt}	the male wage in the non-tradable sectors
w_f^{nt}	the female wage in the non-tradable sectors
w_m^{t}	the male wage in the tradable sectors
w_f^{t}	the female wage in the tradable sectors
lnW_{ij}	the natural logarithm of monthly wage for worker i employed in industry j
i	individual
j	industry
x_{ij}	individual controls: age, age squared, tenure, education level, collective bargaining coverage, administrative responsibility
μ_{ij}	error term

CHAPTER 1

INTRODUCTION

It is a globally established fact that women are discriminated against men in the labor market. This discrimination occurs on two grounds: how much they are represented in the labor market and how much they earn relative to men. Women do not have the same level of access to markets that men do, although that difference has narrowed down by a lot during the past century. According to the World Bank, the female labor force participation rate is around 48% globally, but this figure varies widely across countries, from 6% in Yemen to 56% in the US.

Earning-wise, women earn less than men across the world, even in countries with high levels of gender equality. This fact is referred to as the gender wage gap, which is the difference between the median earnings of women relative to that of men.

According to the International Labour Organization (2018), the global gender wage gap is around 16%. Much of the gap is explained by an over-representation of women in sectors that generally have low pay, as well as an absence of well-functioning labor market policies and institutions. Furthermore, in most countries, regardless of the country income group, differences in labor characteristics that are normally associated with higher labor productivity explain relatively little of the gender wage gap at different points of the wage distribution.

It has been discussed in several papers, such as the one by Wei, Yang, Liu, and Wu (2013), that reducing gender inequality is an important step in maintaining long-term economic growth. First, it can lead to better socio-economic conditions in the country. Improvements in a woman's education can lead to a higher income for the family which can then be used to improve children's nutrition, education, and health. Second, if the female potential is set at the highest level in terms of education, employment, and pay, overall productivity will be improved in the economy. In fact, Wodon and De La Briere (2018) show that closing the gender wage gap could bring as much as $160 trillion to the global economy. Therefore, it is essential for the growth of a country that any systematic discrimination in its labor force is removed.

Some empirical evidence suggests that international trade can be a potential agent for reducing discrimination. It can be a means of inclusive economic growth and inequality reduction, provided that appropriate supporting policies, infrastructure, and an educated workforce are present (United Nations, 2015).

Furthermore, several studies based on neo-classical theories find that being more engaged in international trade can reduce the gender wage gap, especially in developing countries. One reason might be that international trade increases the demand for goods made by low-skilled labor. This can benefit female workers who are generally clustered in low-skilled occupations. However, an even stronger reason might be that international trade eliminates gender discrimination through higher competition. This is based on Becker's (1957) theory of discrimination. When gender discriminating firms face higher competitiveness through international trade, it becomes costlier on them to pay higher male wages. In order to survive in the long run, they must cut costs and eliminate discriminatory practices.

Becker theorizes that inequality is a result of a taste or preference for discrimination. In the case of gender wage inequality, it is assumed that employers have a taste for male workers. The wages paid to men will be higher than the market wage as the employers, for whatever reason, will want to attract more male than female workers. These ideas are formulated as follows:

$$w_m = w^* + d$$
$$w_f < w^* + d$$
$$w_f < w_m$$

where:

w_m = men's wage

w^*= market wage

w_f = women's wage

d = discrimination coefficient

The discrimination coefficient, d, shows that women are earning less than men. However, when trade opens and international firms enter the local market, the company will face more competition and will not receive the same profits that they

had before that enabled them to pay the higher wages to male workers. In order to survive, firms will either pay male workers less or increase female wages to attract cheaper female workers or do both. Therefore, the gender wage gap is expected to be lower in the tradable sectors than the non-tradable sectors.

On the other hand, international trade can also be a reason for increasing wage gaps, as hypothesized by Boler, Javorcik, and Ultveit-Moe (2018). They argue that exporting firms will demand higher flexibility and more commitment from their workers, as they are now working longer hours or across time zones. If women are less flexible or are seen as such, then the gender wage gap will increase.

There are three primary aims of this study. The first is to investigate the gender wage gap present in Turkey's manufacturing sector. The second is to examine the relationship between the gender wage gap and international trade. The third is to examine the trend of the gender wage gap over time. The study fills the gap in the literature by being the first to study the relationship between international trade and the gender wage gap in Turkey.

In the context of this paper, the gender wage gap refers to the difference between the average monthly pay of men and women who work full time. Factors that can affect wages, such as age, job title, and industry, are controlled so that any differentiation in wages between men and women may be attributed to gender discrimination. The data used comes from the structure of earnings survey (SES). This was conducted by TURKSTAT and it provides individual-level data on worker and firm characteristics. It covers three years: 2006, 2010, 2014, and includes 659,952 observations.

Our first step in our quantitative method is to analyze the overall gender wage gap. We decompose the overall gender wage gap by using the Blinder-Oaxaca decomposition method. The usefulness of this method is that it divides the wage gap into three sections. The first part presents the wage gap due to differences in observable labor characteristics such as education, age, experience, occupation, etc.. The second part shows the wage gap due to unexplained reasons, one of which may be discrimination. And the third part is the interaction between the two.

Afterward, we analyze the effect of international trade on the gender wage gap. To do so, we conduct the Blinder-Oaxaca decomposition on the tradable and non-tradable sectors separately to compare the gender wage gap in both. We also run OLS regressions on various specifications, with the null hypothesis that there is no significant difference in the unexplained gender wage gap between the tradable and

non-tradable sectors. Our OLS regression uses the log of basic average monthly salary as the dependent variable. Our independent variables include firm and labor characteristics that are associated with wage levels, such as experience. We also include four categories that will allow us to know the coefficients of female working in the tradable sectors, male working in the tradable sectors, female working in the non-tradable sectors, and male working in the non-tradable sectors. Using the coefficients of these four categories, we can compare the gender wage gap in the tradable sectors and non-tradable sectors.

Lastly, we conduct the decompositions and regression for each year, 2006, 2004, 2010, to see the change in the gender wage gap over time.

Our results from the Blinder-Oaxaca decomposition show that overall there is a 2.6% gender wage gap present in the manufacturing sector in Turkey. This result is close to Aktas and Uysal's (2016) findings of a 3% average gender wage gap. We propose that cultural values may be a reason for the gender wage gap present. Some employers may hold the traditional view that a women's place in society is at home and in taking care of her family. This may make them biased against hiring women, and make them pay female workers less to discourage them from working. Additionally, the view that men are the breadwinners of a family may make employers more sympathetic to men.

Furthermore, there is a prevalent belief in many societies that women, especially young women and mothers, are less committed to their career than men. Employers may undervalue their position in a company, and consequently, offer them lower wages or less promotions and managerial positions. Hiring women can also be seen as a disadvantage to a company as some government policies put in place to protect mothers may leave the impression that it is costlier to hire women.

Our decomposition and regression results also show us that the gender wage gap is higher in the tradable sectors than in the non-tradable sectors. According to the regression results, it is around 3.3% in the tradable sectors and 1.9% in the non-tradable sectors. Similarly, in the decomposition results, it is 4.2% in the tradable sectors and 3.2% in the non-tradable sectors. This is in contrast to Becker's theory. A possible reason for this result might be that while competition from international trade allows only the profitable firms to survive, those firms are also better able to discriminate (Boler et al. 2018). Therefore, instead of decreasing the gender wage gap, international trade could widen it.

Another reason might that exporting firms work with different time zones and

employers will prefer male employees as they are seen to be more flexible and able to work long hours. Again, this is related to societal views on women.

Lastly, we find that discrimination in Turkey's manufacturing sector works in two ways. Whereas in the tradable sectors, male workers are earning higher than what they should be earning, in the non-tradable sectors, female workers are earning less than what they should be earning.

The final aim of the paper is to see whether the gender wage gap has changed over time. This is done by applying the Blinder-Oaxaca decomposition on each year separately. and the results show that the gap has increased from 1% to 2% from the period of 2006 to 2010, and from 2% to around 6% form the period of 2010 to 2014.

The overall structure of this thesis takes the form of five chapters, including this introduction. Chapter two will review the current literature on the topic. Chapter three is concerned with the methodology employed for this study. It also presents some basic descriptive of the data used. Chapter four analyzes the quantitative results of our two research questions. The fifth and final chapter summarizes the main findings of this study and offers some suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

This paper is related to two main strands of the existing literature. The first strand is related to the literature on the gender wage gap, specifically in Turkey. Most of the literature examines the gap within the wage distribution.

Aktas and Uysal (2016) use quantile regressions to discover that once basic labor characteristics such as education are controlled, women earn 4.5% less than men at the high end of the wage distribution. Using the Machado-Mata decomposition, they find that a sizable portion of the gap cannot be explained by labor market characteristics. Likewise, Cudeville and Gurbuzer (2007) find that more than half of the gender wage gap in the formal labor market in Turkey may be due to discrimination. They use the Blinder-Oaxaca decomposition for their analysis. Tekgüç, Eryar, and Cindoğlu (2017) study the gender wage gap for full-time formal employees by disaggregating them by the level of education. They discover that despite the increase in female labor force participation, the overall gender wage gap increased at all levels of education, from 2004 to 2011. While these studies confirm the existence of a gender wage gap in Turkey, they do not go examine whether international trade has any effect on it. This paper aims to fill in the gap in the literature by doing so.

The second strand of literature is on the relationship between the gender wage gap and international trade. Several papers study the link between the two, with differing results. Abegaz and Nene (2018) and Chen, Ge, Lai, and Wan (2013) both find a negative relationship between the two. Abegaz and Nene (2018) use a panel of manufacturing data from Ghana to study labor market gender discrimination for the period of 1992–2003. Their findings show evidence that globalization reduces gender discrimination through greater employment of women and more inclusive labor hiring. Chen et al. (2013) have similar results. Exporting firms hire more female workers than non-exporting firms and any gender wage gap due to discrimination is only among private and non-exporting firms. Both papers confirm Becker's discrimination theory that competition may reduce discrimination against workers of equal productivity. This

paper will also use the same concept when analyzing the relationship between international trade and the gender wage gap.

Other factors may also be responsible for the negative relationship between the gender wage gap and international trade. Almasifard (2018) studies a sample of 13 developing upper-middle-income countries from 2001 to 2015. Almasifard finds that international trade provides more job opportunities for women and increases their wage rate. Exporting firms will hire more to expand their activities and they will usually hire the comparatively cheaper women to maintain their competitive advantage. In another cross-country study, Yamamura (2016) also discovers that market competition through international trade decreases the gender wage gap.

In a study done on United States' manufacturing data, Black and Brainerd (2002) find that trade openness brings more opportunities for women to work in better job positions. This leads to an increase in women working with higher salaries.

Juhn, Ujhelyi, and Villegas-Sanchez (2014) study the impact of trade on the gender wage gap through the effect of technology. The argument is that once the trade is liberalized through tariff reductions, productive firms enter the international market and consequently update their technology to stay competitive. This brings less physically demanding skills and as a result, the wage and employment of females in blue-collar jobs improve. The research is conducted on a panel data set from Mexico and the findings are consistent with their model.

However, not all papers show a negative relationship. Using 2006 United States data, Kim and Tebaldi (2006) discover that while export intensiveness reduces the overall gender wage gap, there is no impact from import penetration. This contradicts Becker's theory that stronger market competition from increased imports will reduce the gender wage gap.

One reason for a positive relationship between international trade and the gender wage gap could be due to the need to work across different time zones. In a study using Norwegian data, Boler et al. (2017) find that a firm becoming an exporting firm will experience an increase in the gender wage gap by about 3% for college-educated workers. This is because employees who can communicate with partners across different time zones may be rewarded disproportionately more as compared to others. As a result, women who are perceived to be less flexible by employers may be paid less.

Skill-biased technological change can be another reason. Menon and Rogers (2009) base their study in India's manufacturing sector and find that increasing openness to trade is associated with larger wage gaps, specifically in import-oriented industries. This is because import-oriented industries in India tend to be more skilled-labor intensive which leads to a higher demand for skilled labor. Since skilled labors are more likely to be male, this may lead to increased preference of male workers over female.

Lastly, this paper is closest to Molina (2016) in terms of methodology. Molina compares the Oaxaca decomposition for the tradable and non-tradable sectors to see whether international trade affects the gender wage gap in Bolivia's agricultural sector. The findings in his paper suggest that being exposed to international trade does not affect the gender wage gap in Bolivia's agricultural sector.

The results of this paper confirm the existence of a gender wage gap in Turkey. This is consistent with the findings by Aktas and Uysal (2016), Cudeville and Gurbuzer (2007), Tekgüç et al. (2017), and Kaya (2017). While those papers analyzed in-depth the distribution of the gender wage gap in Turkey, this paper focuses on the manufacturing sector and uses updated data. To the extent of our knowledge, this paper will be the first to study the effect of international trade on the gender wage gap in Turkey. The results show that international trade worsens the gender wage gap in Turkey's manufacturing sector, similar to the results of Boler et al. (2017) and Menon and Rogers (2009).

CHAPTER 3

DATA AND METHODOLOGY

3.1 Data

This study uses data from the Structure of Earnings Survey (SES), which is conducted by the Turkish Statistical Institute (TURKSTAT). The survey provides individual-level data on worker and firm characteristics. It covers three years: 2006, 2010, 2014, and includes 659,952 observations. From this data set, we only include the industries under the manufacturing sector and exclude part-time workers. Seventy-six percent of the employees in the data set are male and twenty-four percent are female.

Table 1 presents some descriptive statistics. It includes some basic employee characteristics, such as average age and education level. For each category, it presents the number and percentage of female workers, male workers, workers in the tradable sectors, and workers in the non-tradable sectors present.

The average basic monthly salary is calculated by a simple formula: basic monthly wage * (30/ number of paid days in a month). On average, the basic monthly salary for males is 1361 TL and for females is 1417 TL. The higher average female salary can be attributed to the fact that female workers are better educated. The biggest portion of female workers, which is 37%, holds a higher education, while the biggest portion of male workers, around 30%, holds only a primary school level of education or lower. Moreover, 20% of the female employees are either managers or professionals while only 12% of the male employees are holding managerial positions. The fact that women in our sample are at higher levels of the job ladder may result in higher average earnings of females.

The average age for female workers is 31, while for male workers it is 34. Women also have lower average years of experience. The average tenure for female workers is 3 years while for male workers it is 4 years. Almost half of both male and female workers are in firms that have less than 50 employees.

Moving on to the fourth and fifth columns of Table 1, we see that 62% of employees in our data work in the non-tradable sectors. They earn more than the workers in the

tradable sectors. In addition, they have a higher average educational attainment. Approximately 65% of them have an education level ranging from high school to higher education, while only 45% do in the tradable sectors. Furthermore, 18% of the employees in the non-tradable sectors are either managers or professionals. In contrast, only 8% of employees in the tradable sectors are either managers or professionals. Both sectors have around 14% of their employees holding administrative positions.

Table 2 presents the male and female observations working in different industries. We find that around 60% of male workers and 70% of female workers work in the non-tradable sectors.

In the tradable sector, female employees are concentrated in the textile and food subsectors, while in the non-tradable sectors they are concentrated in wholesale and retail trade, financial intermediation, and other social activities subsectors. Male employees are concentrated in the textile, food, basic metals, and machinery and equipment subsectors. In the non-tradable sectors, they are concentrated in the wholesale and retail trade, transportation, construction, and other social activities subsectors.

Table 3 shows that on average, female and male employees working in the non-tradable sectors have a higher salary than female and male employees working in the tradable sectors. Female employees in the non-tradable sector earn the highest average salary, 1558 TL, while their male counterparts earn 1478 TL. In Table 4, the average salary of female and male employees in the subsectors they are least and most represented in is displayed. Almost 30% of all female employees are employed in the wholesale and retail subsector. Their average salary of 1164 TL is lower than the overall average female salary. Around 12% of all female employees are situated in the financial intermediary subsector. Their average salary of 2372 TL is higher than the average salary of female employees in the tradable sectors, non-tradable sectors, and total data set.

Female employees working in the textile subsector earn the lowest, with a basic average salary of only 785 TL. Male employees earn the least in the leather and textile subsectors. They earn the highest in the coke manufacturing and social and personal services subsectors.

Finally, we analyze each sector's raw gender wage gap in table 5. We see that the raw gender wage gap is highest in the health and social services subsector. It is an average difference of 446 TL. This is followed by financial intermediary subsector where there

is an average difference of 195 TL, and the food, beverages, and tobacco subsector, where there is an average gap of 121 TL.

The subsectors where is the least between the average male and female earnings are basic metals subsector, pulp, paper, printing and publication subsector, leather and leather products subsector, and plastic and rubber products subsector.

As for the subsectors in which the average female earnings is higher than the average male earnings, there are several. The highest gap is found in the mining and quarrying subsector where there is an average difference of 416 TL, then in the coke, refined petroleum and nuclear fuel subsector, where there is an average difference of -359 TL. This is followed by the man-made fiber subsector, transportation vehicles subsector, transport, storage, and communication subsector, and real estate subsector.

Table 1. Descriptive statistics (TURKSTAT and author's calculations)

	Male	Female	Trade	Non-trade
Number of observations	76%	24%	38%	62%
Average basic monthly salary	1361	1417	1181	1494
Ln average basic monthly salary	6.93	6.97	6.83	7.01
Average age	34	31	33	34
Average tenure	4	3	4	3
Educational attainment				
Primary school and below	29%	16%	34%	20%
Primary and secondary school	18 %	11%	20%	13%
High school	24%	28%	19%	28%
Vocational High school	10%	8 %	12%	8%
Higher education	20 %	37%	14%	30%
Total	100%	100%	100%	100%
Firm size				
10-49	45%	43%	45%	43%
50-249	12%	13%	8%	15%
250-499	12%	12%	13%	11%
500-999	21%	21%	23%	20%
1000	10%	11%	10%	11%
Total	100%	100%	100%	100%
Under collective pay agreement				
Yes	11%	7%	13%	8%
No	89%	93%	87%	92%
Total	100%	100%	100%	100%
Administrative responsibility				
Yes	14%	13%	13%	15%
No	86 %	87%	87%	85%
Total	100%	100%	100%	100%
Occupation				
Managers	8%	10%	5%	10%
Professionals	5%	10%	3%	8%
Technicians/ associate professors	12%	15%	10%	15%
Clerks/Service/Sales	23%	39%	11%	36%
Crafts/trade	21%	8%	33%	8%
Operator	17%	6%	24%	8%
Low-skilled service	15%	12%	14%	15%
Total	100%	100%	100%	100%

Table 2: Industry types (TURKSTAT and author's calculations)

	Male	Female
Tradable	41%	30%
Food products, beverages and tobacco	11%	11%
Textile and textile products	17%	39%
Leather and leather products	3%	2%
Wood products	2%	1%
Pulp, paper and paper products; Printing and publication	6%	5%
Coke, refined petroleum products and nuclear fuel	4%	2%
Man-made fibers with chemicals and products	4%	5%
Plastic and rubber products	6%	4%
Other non-metallic mineral products	7%	4%
Basic metals and fabricated metal products	9%	5%
Machinery and equipment	9%	5%
Computers, electrical electronic and optical products	6%	8%
Transportation vehicles	8%	4%
Manufactures nec	7%	5%
Total	100%	100%
Non-tradable	59%	70%
Mining and quarrying	3%	0.6%
Electricity, gas, steam and hot water	5%	1%
Construction	12%	5%
Wholesale and retail trade; repair of motor vehicles, personal goods	28%	27%
Hotels and restaurants	8%	7%
Transport, storage and communication	14%	8%
Activities of financial intermediary institutions	5%	12%
Real estate, rental and business activities	5%	5%
Education	3%	8%
Health and social services	2%	7%
Other social and personal service activities	14%	18%
Total	100%	100%

Table 3: Earnings by gender in the tradable and non-tradable sectors (TURKSTAT and author's calculations)

	Average earnings of female workers	Average earnings of male workers
Trade	1077	1182
Non-trade	1558	1478

Table 4: Average earnings in selected sub-sectors (TURKSTAT and author's calculations)

	Average earnings of employees in sub-sectors they are most represented in	
	Female employees	Male employees
Activities of financial intermediary institutions	2373	-*
Textile and textile products	786	826
Wholesale and retail trade; repair of motor vehicles, personal goods	1164	1193
Transport, storage and communication	-	1602
Construction	-	1114
Other social and personal service activities	1956	2027

	Average earning of employees in the sub-sectors they are least represented in	
	Female employees	Male employees
Wood products	983	965
Leather and leather products	793	801
Coke, refined petroleum products and nuclear fuel	2605	2246
Mining and quarrying	1567	-
Electricity, gas, steam and hot water	1963	-
Man-made fibers with chemicals and products	-	1817
Health and social services	-	1767

* - represents does not apply

Table 5: Industry wage gaps (TURKSTAT and author's calculations)

	Average male earnings	Average female earnings	Gender wage gap*
Tradable			
Food products, beverages and tobacco	1244	1123	121
Textile and textile products	826	785	41
Leather and leather products	801	793	8
Wood products	965	983	-18
Pulp, paper and paper products; Printing and publication	1331	1334	-3
Coke, refined petroleum products and nuclear fuel	2246	2605	-359
Man-made fibers with chemicals and products	1817	2072	-255
Plastic and rubber products	1031	1021	10
Other non-metallic mineral products	1073	1138	-65
Basic metals and fabricated metal products	1144	1143	1
Machinery and equipment	1192	1218	-26
Computers, electrical electronic and optical products	1451	1206	245
Transportation vehicles	1452	1630	-178
Manufactures nec	1040	1091	-51
Non-tradable			
Mining and quarrying	1151	1567	-416
Electricity, gas, steam and hot water	1941	1963	-22
Construction	1114	1206	-92
Wholesale and retail trade; repair of motor vehicles, personal goods	1193	1164	29
Hotels and restaurants	1102	1078	24
Transport, storage and communication	1602	1830	-228
Activities of financial intermediary institutions	2567	2372	195
Real estate, rental and business activities	1132	1281	-149
Education	1294	1332	-38
Health and social services	1767	1321	446
Other social and personal service activities	2027	1956	71
Total	100%	100%	

*(Gender wage gap= average male earnings-average female earnings)

3.2 Methodology

To see whether there exists a gender wage gap in the data, we use the Blinder-Oaxaca decomposition (Blinder 1973; Oaxaca 1973). The method decomposes the gender wage gap into three components: the gender wage gap due to employee endowments or characteristics, the gap due to unexplained reasons or due to factors not normally associated with differences in wages, and the gap due to an interaction of the first two components.

The first component shows the wage gap due to differences in productivity which are expected. For example, a worker with more years of experience is expected to have a higher wage. We include as variables several observable characteristics that are normally associated with higher productivity. These characteristics are age, age squared, tenure, educational attainment, holding administrative responsibility, and occupation. Being under a collective pay agreement, working in the tradable sectors or not, firm size, and industry are also included as they may also affect wages. A detailed explanation of the variables is included in the appendix.

As a side note, industry and occupation can both be considered as endogenous variables, as the industry an individual works in or the occupation one has can be considered as part of gender discrimination in the labor market (Aktas & Uysal, 2016). Despite that, they are both still added as it is interesting to see whether the gender wage gap will be reduced after adding them or not.

The second component removes the effect of all those characteristics. Therefore, if any wage gap is still present in the second component, it is assumed to be as a result of discriminatory practice.

The decomposition is formulated as follows:

$$Y_m = \beta_{0m} + \beta_{1m} x_m \quad (4.1)$$

where:

Y_m = the average wage for male workers

β_{0m} = the intercept

β_{1m}= observable male worker characteristic

$$Y_f = \beta_{0f} + \beta_{1f} x_f \quad (4.2)$$

where:

Y_f = the average wage for female workers

β_{0f} = the intercept

β_{1f}= observable female worker characteristic

The gap between the male and female average wages is:

$$Y_m - Y_f = (\beta_{0m} - \beta_{0f}) + (\beta_{1m} x_{1m} - \beta_{1f} x_{1f}) \quad (4.3)$$
$$= G_0 + G_1$$

Where G_0 is the differences in the intercepts and G_1 is the differences in x_1 and β_1. As a specific example, G_1 can be the measurement of the part of the wage gap due to differences in the average age, x_1, and due to the differences in the effects of the average age, β_1.

We then see how much of the overall wage gap is due to the x (characteristics) and how much of it is due to the β (coefficients). In other words, we decompose G_1.

The differences due to the xs will be the explained component and the differences due to the βs will be the unexplained component.

This is formulated as follows:

$$Y_m - Y_f = \Delta x \beta_f + \Delta \beta x_m = E + (CE + C) \quad (4.4)$$

and

$$Y_m - Y_f = \beta_m \Delta x + \Delta \beta x_f = (E + CE) + C \quad (4.5)$$

where:

E= gap in endowments (characteristics)

C= gap in coefficients

CE = gap arising from the interaction of endowments and coefficients

The difference between (4.4) and (4.5) is that in (4.4) the interaction term between the x and β is included in the explained component whereas in (4.5) it is included in the unexplained component.

The Blinder-Oaxaca decomposition can also be rewritten as:

$$Y_m - Y_f = \Delta x \left[D\beta_m + (I - D)\beta_f\right] + \Delta\beta \left[x_m (I - D) + x_f D\right] \quad (4.6)$$

where:

I = the identity matrix and

D = a matrix of weights.

In (4.4), D is equal to 0 and in (4.5), it is equal to 1.

Cotton's (1988), Reimers' (1983) or Neumark's (1988) are other decomposition methods that use different weight matrices. In Cotton's method, $D = 0.5$. The difference in xs are weighted by the mean of coefficient vectors, and the interaction term effect is placed equally between C and E. In Reimer's method, $D = N_m/N$. The difference in xs is weighted by the proportions in the two groups. Neumark (1988) suggest to make use of the coefficients from the pooled data regression, β_f:

$$Y_m - Y_f = \Delta x \, \beta_f + [x_m (\beta_m - \beta_f) + x_f (\beta_f - \beta_m) \quad (4.7)$$

None of these methods is more preferred than the other. In this paper, we set $D = 0$ and use the decomposition formula expressed in Equation (4.4).

To examine the effect of international trade on the gender wage gap, we also apply the Blinder-Oaxaca decomposition on the tradable and non-tradable sectors separately and then compare the discrimination coefficient in each.

$$w_m^{nt} - w_f^{nt} = w_m^t - w_f^t \quad (4.8)$$

where:

w_m^{nt}= The male wage in the non-tradable sectors

w_f^{nt} = The female wage in the non-tradable sectors

w_m^t= The male wage in the tradable sectors

w_f^t = The female wage in the tradable sectors

In order for Becker's theory to be correct, our null hypothesis is that there is a significant difference in the gender wage gap between the tradable and non-tradable sectors, and the gap in the non-tradable sectors is higher than the tradable sectors. Our alternative hypothesis will be:

$$w_m^{nt} - w_f^{nt} > w_m^t - w_f^t \quad (4.9)$$

If the null hypothesis is rejected and the alternative hypothesis is accepted, this will show that international trade does reduce discrimination in the wages.

To further our analysis on whether international trade affects the gender wage gap, we run an OLS regression on the log of basic average monthly salary. In order to compare the gender wage gaps within the two sectors, we form two dummy variables:

1-Female: where female employees is 1, and male employees is 0.

2-Trade: where the tradable sectors is 1, and non-tradable sectors is 0.

We then interact the two variables to get four categories:

1-Female_trade: the female employees in the tradable sectors.

2-Male_trade: the male employees in the tradable sectors.

3-Female_nontrade: female employees in the non-tradable sectors.

4-Male_nontrade: It is the error term and represents male employees in the non-tradable sectors.

We will measure the gender wage gap by comparing the coefficients of these four variables. The difference between the female-trade and male-trade gives the gender wage gap in the tradable sectors. The difference between the female-non-trade and male-non-trade gives the gender wage gap in the non-tradable sectors. The two gender wage gaps are then compared to see which one is smaller. We also include in our model individual controls, X_{ij}.

Our first model is as follows:

$$lnW_{ij} = x_{ij} + \beta_1 female\_trade + \beta_2 female\_nontrade + \beta_3 male\_trade + \mu_{ij}$$

where:

i = individual

j = industry

lnW_{ij}= the natural logarithm of monthly wage for worker i employed in industry j.

x_{ij} = individual controls: age, age squared, tenure, education level, collective bargaining coverage, administrative responsibility

μ_{ij} = error term

In the second model we include a dummy variable for each of the 7 occupations in our sample. The third model adds on a dummy variable for each firm size. Lastly in the fourth model we control for industry by including a dummy variable for each industry type summarized in Table 2 in addition to the occupation and firm. In that sense the fourth model is the most conservative one controlling for occupations, firm and industry types.

Lastly, we apply the decomposition on each year separately to see the change in the gender wage gap over time.

CHAPTER FOUR

RESULTS

4.1 Gender Wage Gap

Our first step is to use the Blinder-Oaxaca decomposition to test the presence of a wage gap. Table 5 presents the decomposition results, in the form of the log of mean wages. The mean prediction of the log of female wages is 6.97 and of the male wages is 6.93. The raw differentials show that female employees are earning on average 3.9% more than male employees. This is expected as the female employees, in general, have a higher education level as compared to the male employees. Almost 40% of the female employees have a higher education level, while only 20% of the male employees do. The female employees are also more concentrated at the top of the job ladder. Around 20% of the female employees are either managers or professionals while only 12% of the males are. Therefore, it is not surprising that on average female employees will have a higher salary than male employees.

The raw differential result differs from Aktas and Uysal's (2016) findings. Their study discovered an overall negative, raw gender wage gap. However, their data set only covers data from 2006 while our data set covers 2010 and 2014 as well, suggesting that on the surface the situation for female workers has improved wage-wise.

Going further, Table 5 also presents the wage differentials according to employee endowments and according to the coefficients or unexplained factors. According to the endowments figure, when individual labor market characteristics are taken into account, female employees should actually be earning 6.5% more than males, instead of only 3.9% more. In other words, if the female employees in the data set were rewarded as if they were males, they would have a higher wage than at present. The raw differentials due to coefficients show that there are some unexplained factors present that are pulling the female wages down by 2.6%. This points to a gender wage gap of 2.6% present due to discrimination. This figure is not that different from Aktas and Uysal's (2016) findings of an average of 3% gender wage gap.

Table 6: Summary of decomposition results: tradable + non-tradable

Mean prediction of female wages	6.973
Mean prediction of male wages	6.934
Raw differential (female - male)	0.039
- due to endowments (E)	0.065
- due to coefficients (C)	-0.034
- due to interaction (CE)	0.008

Table 7: Decomposition results for variables: tradable + non-tradable

Variables	(E)	(C)	(CE)
trade	0.006	-0.005	0.001
age	-0.074	0.545	-0.043
agesq	0.044	-0.292	0.044
cpa	-0.009	-0.004	0.002
tenure	-0.020	0.015	-0.003
edu	0.090	0.041	0.010
admin	-0.004	0.001	-0.000
year	0.031	-9.341	-0.001
occ	yes	yes	yes
firm	yes	yes	yes
industry	yes	yes	yes
Constant	0.000	9.008	0.000
Total	0.065	-0.034	0.0038

Moving on to Table 6, the decomposition results also present the contribution of each variable to the overall explained gap. The second column shows just how much each of the coefficients contributes to the gap due to endowments. In terms of their endowments, female employees are helped by experience (represented by age squared) and education level, the most. They account for most of the explained wage gap that female employees have over male employees.

The third column presents the contribution of each variable to the overall unexplained gap. From there, we can infer that being under a collective pay agreement, working in the tradable sectors, and having experience disfavors female employees the most. It is these three variables that are pulling down the female wages, and contributing to the overall negative wage gap due to unexplained factors. This shows that although experience has a significant and positive effect on female average salary, it is also the factor in which its returns to wages is not as high as it should be. Another important

point to mention is that in contrast to Becker's theory, working in a tradable sector worsens the earnings for female employees.

4.2 Gender Wage Gap and International Trade

In order to see whether international trade affects the gender wage gap, we perform the Blinder-Oaxaca decomposition for the tradable sectors and non-tradable sectors separately. The results of the decomposition in the tradable sector are presented in Table 7.

Table 8: Summary of decomposition results: tradable

Mean prediction of male wages	6.836
Mean prediction of female wages	6.756
Raw differential (male-female)	0.080
- due to endowments (E)	0.033
- due to coefficients (C)	0.042
- due to interaction (CE)	0.005

Table 9: Decomposition results for variables: tradable

Variables	(E)	(C)	(CE)
age	0.052	-0.148	-0.010
agesq	-0.036	0.122	0.016
cpa	0.015	-0.003	-0.002
tenure	0.026	0.002	0.001
edu	-0.032	-0.008	0.001
admin	0.003	0.003	0.000
year	0.004	1.292	0.000
occ	yes	yes	yes
firm	yes	yes	yes
industry	yes	yes	yes
Constant	0.000	-1.218	0.000
Total	0.033	0.042	0.005

Table 10: Summary of decomposition results: non-tradable

Mean prediction of female wages	7.064
Mean prediction of male wages	6.998
Raw differential (female-male)	0.066
- due to endowments (E)	0.089
- due to coefficients (C)	-0.032
- due to interaction (CE)	0.009

Table 11: Decomposition results for variables: non-tradable

Variables	(E)	(C)	(CE)
age	-0.096	0.702	-0.062
agesq	0.062	-0.360	0.061
cpa	-0.006	-0.008	0.002
tenure	-0.015	0.019	-0.003
edu	0.113	0.053	0.013
admin	-0.005	0.002	-0.000
year	0.036	-9.841	-0.002
occ	yes	**yes**	yes
firm	yes	yes	yes
industry	yes	yes	yes
Constant	0.000	9.402	0.000
Total	0.089	-0.032	0.009

The mean prediction of the male wages is 6.83 and that of the female wages is 6.75. Overall, the raw differentials show that males have a higher average wage than females by 8.0%. Of that, only 3.3% is explained by labor endowments. The remaining 4.2% wage gap is due to unexplained reasons, presumably discrimination.

The second column of Table 8 shows which factor contributes by how much to the explained part of the gap. We see that it is the age and tenure that helps male employees the most in terms of wages. This is not surprising as on average the male employees in the data set have a higher age and tenure. The third column reveals factors that explain the unexplained part of the gap. We see that experience contributes the most to the negative discrimination against women.

Table 9 presents a summary of the decomposition results in the non-tradable sectors. We see that female employees have a higher average wage than males by 6.6%. However, once the basic labor market characteristics are taken into account, the wage gap in favor of females increases to 8.9%. There are unexplained factors present that are pulling down female wages by 3.2%, which is evidence of discrimination against women.

Table 10 shows that experience and education level account for most of the positive explained gap between female and male wages. At the same time being under a

collective pay agreement and experience disfavors female employees the most. Similar to the results in Table 6, being under a collective pay agreement and experience are the factors that deteriorate female wages. In other words, it contributes the most to the gap between male and female wages.

From these results, a few statements can be made. In the tradable sectors, there was a raw differential of 8.0% in favor of males but only 3.3% of that was accounted for by differences in endowments. This brings a gender wage gap of 4.2% present. On the other hand, female employees in the non-tradable sectors are earning 6.6% more than male employees. However, taking their endowments into account, they should be earning 8.9% instead. This brings a gender wage gap of 3.2% present. The gender wage gap is lower in the non-tradable sectors than in the tradable sectors, in contrast to our expectations. In addition, it seems that discrimination in Turkey's manufacturing sector works in two ways. In the tradable sectors, male workers are earning higher than what they should be earning. In the non-tradable sectors, female workers are earning less than what they should be earning.

As our next step in our quantitative analysis, we perform an OLS regression to analyze the gender wage gap in both the tradable and non-tradable sectors. We run four different models and their results are shown in Table 11. From these results, the gender wage gap in the tradable sectors and non-tradable sectors are presented in table 12.

The first column in table 11 shows the results for the most liberal model. This model includes the least number of control variables than the other models, as it excludes firm size, occupation, and industry dummies.

The female employees in the non-tradable sectors earn 2.07% less than the male employees in the non-tradable sectors. At the same time, the female employees in the tradable sectors earn 4.22% less than the male employees in the tradable sectors. The gender wage gap is less in the non-tradable sectors than in the tradable sectors, just as in the decomposition.

The coefficients on the other variables all have the expected signs. Except for age squared, the variables have a positive and significant on wages. The positive sign of age and negative sign of age squared is in line with the idea that the logarithm of wage increases with age till it reaches a peak at some point and then starts to fall.

Table 12: Regression results

	(1)	(2)	(3)	(4)
VARIABLES	Model 1	Model 2	Model 3	Model 4 (Base Model)
male in trade	-0.0618***	-0.0499***	-0.0450***	-6.91e06
	(0.00130)	(0.00136)	(0.00133)	(0.00414)
female in non-trade	-0.0207***	-0.0264***	-0.0263***	-0.0192***
	(0.00160)	(0.00157)	(0.00153)	(0.00153)
female in trade	-0.104***	-0.0976***	-0.0960***	-0.0335***
	(0.00224)	(0.00220)	(0.00214)	(0.00455)
age	0.0304***	0.0286***	0.0281***	0.0259***
	(0.000385)	(0.000376)	(0.000365)	(0.000358)
age squared	-0.000286***	-0.000280***	-0.000263***	-0.000241***
	(5.17e-06)	(5.04e-06)	(4.90e-06)	(4.80e-06)
cpa	0.197***	0.215***	0.117***	0.0804***
	(0.00197)	(0.00193)	(0.00196)	(0.00198)
tenure	0.0283***	0.0285***	0.0241***	0.0223***
	(0.000128)	(0.000126)	(0.000125)	(0.000124)
education	0.144***	0.106***	0.0955***	0.0866***
	(0.000407)	(0.000475)	(0.000466)	(0.000466)
admin	0.275***	0.143***	0.142***	0.131***
	(0.00167)	(0.00182)	(0.00177)	(0.00175)
year	0.0958***	0.0957***	0.0919***	0.0914***
	(0.000171)	(0.000171)	(0.000168)	(0.000172)
occupation	No	Yes	Yes	Yes
firm	No	No	Yes	Yes
industry	No	No	No	Yes
constant	-186.8***	-186.8***	-178.4***	-177.4***
	(0.344)	(0.344)	(-0.338)	(0.345)
observations	660,204	660,204	660,204	660,204
r-squared	0.540	0.563	0.587	0.606

*** represents p<0.001 significance level

Table 13: Regression results: gender wage gap

	Model 1	Model 2	Model 3	Model 4
Tradable GWG	0.0422	0.0471	0.051	0.0334*
Non-tradable GWG	0.0207	0.0264	0.0263	0.0192

*Indicates that the difference between male_trade and female_trade is significantly different from each other at p<0.001 significance level

The variable *admin* makes the biggest difference in earnings, as individuals that hold a supervisory position earn around 28% more than those without. Other factors that make a substantial difference in earnings are education and cpa. Being under a collective pay agreement raises earnings by 19.7% and increasing educational attainment raises earnings by about 14%.

Model 2 adds on the occupation variable, and the results are presented in column 2. A dummy variable for each occupation category is created.[1] The wage gap is now increased in both sectors. It is 4.71% in the tradable sectors and 2.64% in the non-tradable sectors. The positive effect of holding an administrative position and educational attainment is lessened, from 27% to 14% and from 14% to 10%, respectively. On the other hand, the effect of cpa is higher and it increases earnings by 21.5%.

Model 3 controls for firm size by creating dummy variables for different firm sizes[2]. The gender wage gap in the non-tradable sector is unchanged but the gender wage gap in the tradable sector is now 5.10%. The coefficients of the other variables are more or less the same, except for cpa's which has reduced to 11%.

The last model is the most conservative one as it includes the most set of control variables. Occupation, firm and industry dummies are now all included. The effect of this is a reduction in the gender wage gap in both sectors. From our regression, the gender wage gap in the tradable sector is around 3% while in the decomposition, it is 4.2%. Likewise, in the non-tradable sectors the gender wage gap is 1.9% in the

[1] Managers; Professionals; Technicians and associate professors; Clerk, services, and sales; Crafts and trade; Operator; Low-skilled service.

[2] 10-49, 50-249, 250-499, 500-999, 1000

regression and 3.2% in the decomposition. Apart from that, there is not much change in the variable coefficients.

The other variable coefficients do not change much. Comparing the gender wage gap figures in model 1 to model 4, we can see a sizable reduction in the gender wage gap in the tradable sectors. It changes from 4.22% to 3.44%. In the non-tradable sectors, there is little change. Model 4 is our benchmark model and when we compare the gender wage gaps in the two sectors, we find the gap in the tradable sectors to be 3.3% and in the non-tradable sectors to be 1.9%. Our earlier decomposition results show a gap of 4.2% in the tradable sectors and 3.2% in the non-tradable sectors. All in all, the results from the regression confirm the decomposition results. The gender wage gap in the non-tradable sectors is less than the gender wage gap in the tradable sectors. This result is similar to what was found by Boler et al. (2017), and Menon and Rogers (2009).

In order to get some plausible explanations, we turn to the literature reviewed. Boler et al.'s (2018) reasoning for the positive relationship between trade and the wage gap, was that working across large time zones increases demand for male workers who are seen as more flexible than women. Looking at table 13, this could be a possible reason. Most of Turkey's main exporting destinations are in countries that have an overlap in time zones with Turkey. Turkey's time zone is GMT+3. The same goes for Turkey's main importing origins.

Table 14: Turkey's top trading partners (oec.world)

	Country	Time Zones
	Turkey's top exporting destinations	
1.	Germany	GMT+2
2.	United Kingdom	GMT+1
3.	Italy	GMT+2
4.	United Arab Emirates	GMT+4
5.	Iraq	GMT+3
6.	United States	GMT-4 (in Washington DC)
7.	France	GMT+2
8.	Spain	GMT+2
9.	Belgium-Luxembourg	GMT+2
10.	Poland	GMT+2
	Turkey's top importing origins	
1.	China	GMT+8
2.	Germany	GMT+2
3.	Russia	GMT+3 (Moscow)
4.	Italy	GMT+2
5.	United States	GMT-4 (in Washington DC)
6.	France	GMT+2
7.	United Kingdom	GMT+1
8.	Switzerland	GMT+2
9.	Spain	GMT+2
10.	United Arab Emirates	GMT+3

Furthermore, the wage gap in Boler et al.'s (2018) paper was larger for college-educated women. College-educated women are a proxy for non-production workers who are more likely to be working with customers, hence trading across time zones would affect them more. This could be the case in our paper as the data contains more highly-educated women who would likely not be in the production area. However, looking at our descriptive statistics, we see that the percentage of women with higher education in the non-tradable sectors is 30%, while in the tradable sectors, it is around half of that. Furthermore, there are also more women holding an administrative position or having a managerial or professional occupation in the non-tradable sectors than in the tradable sectors.

Boler et al. (2018) also suggest that some countries with low women rights or more conservative attitudes may dislike communicating with female employees and prefer

to communicate with male employees. Therefore, employees are fulfilling the demands of their customers in the country that they are trading with, instead of purposely discriminating against women. However, again looking at Turkey's main trading partners this does not seem to be the case.

Lastly, Boler et al. (2018) propose that in an environment of tough competition only the most profitable firms survive. They are also the firms most able to discriminate. Therefore, while Becker's theory that international trade forces out the less competitive firms stands true, it is possible that discrimination will not decrease. Based on this, a strong recommendation for future research would be to include firm profitability as a control variable.

On the other hand, Menon and Rogers (2009), offer the argument that an increase in the gender wage gap through international trade happens due to a skill-biased technological change. Since female employees are generally clustered in low skilled occupations and male employees in skilled occupations, technological change will increase demand for male workers and increase their wages. Menon and Rogers (2009) find that in less concentrated industries (less capital-intensive industries) the wage gap reduced, while in the more concentrated industries it increased.

In the context of their study in India, it could mean that instead of in-firm discrimination, there is wider discrimination present in the country which is the reason why there aren't more women working in the concentrated industries. Menon and Rogers (2009) propose policies on promoting female education to allow women to reach the same level of education as men and to increase the number of skilled female labor.

However, if we applied this theory to Turkey and found the same results, it would not be a lack of education that is placing female employees in unskilled occupations. The rate of female participation in academia in Turkey is around 45%, which is above the European Union average.

Instead, we can propose that cultural values and ideas on female roles, can be a reason for the gender wage gap present. Women in Turkey were only allowed in 2002 to legally work without their husband's permission (Strauss, 2015). In 2016, Turkey's president said in a public speech that women who work instead of being housewives and mothers are "half-persons" (Bruton, 2016). If employers hold this view of women, they may feel inclined to pay women lower wages to discourage them from working.

Another view, that is common in a lot of societies, is that women are less committed and more of a short-term employee. This is because of the idea that all women, especially young women, will eventually quit to take of their families. Boler et al. (2018) address this in their paper, by restricting their data to under-45s and running their regressions again. They find that a lower business hour overlap is associated with a higher gender wage gap among employees under 45 than in the total data set of workers.

Unfortunately, some government policies put in place to protect mothers can backfire. Longer maternity leave entitlement and obligations for big companies to have on-site daycare may leave the impression that it is costlier to hire women. Therefore, an appropriate solution could be for the government to subsidize those companies that accommodate working mothers.

4.3 Gender Wage Gap over Time

After applying the Blinder-Oaxaca decomposition for each separate year, we get figure 1. The trend shows that from 2010 to 2014, there is a large increase in the gender wage, as compared to the period from 2006 to 2010.

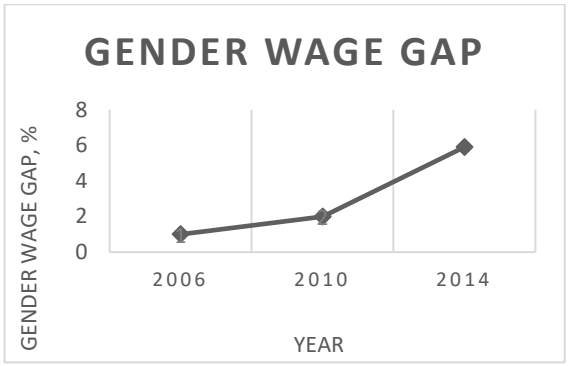

Figure 1: Gender wage gap over time

Table 15 and 16 present the results of the decomposition on the data set of 2006. From table 15, we see that the mean prediction of the log of female wages is 6.63 and of the male wages is 6.62. The raw differentials show that female employees are earning on average 0.8% more than male employees, however, the raw differentials according to their endowments show that females should be earning 1.8% more than men. Therefore, there is a small wage gap of 1% in 2006.

The second column of table 16 shows that education and experience help female employees the most in terms of wages. The third column shows that working in the tradable sectors, experience, being under a collective pay agreement, and holding an administrative position are all factors in which a discrimination factor may be present.

Table 15: Summary of decomposition results: 2006

Mean prediction of male wages	6.621
Mean prediction of female wages	6.630
Raw differential (female-male)	0.008
- due to endowments (E)	0.018
- due to coefficients (C)	-0.022
- due to interaction (CE)	0.012

Table 16: Decomposition results for variables: 2006

Variables	(E)	(C)	(CE)
trade	0.005	-0.007	0.001
age	-0.074	0.732	-0.068
agesq	0.043	-0.377	0.064
cpa	-0.015	-0.010	0.005
tenure	-0.025	0.007	-0.002
edu	0.085	0.045	0.012
admin	-0.002	-0.003	0.000
occ	yes	yes	yes
firm	yes	yes	yes
industry	yes	yes	yes
Constant	0.000	-0.410	0.000
Total	0.018	-0.022	0.012

Table 17 presents the decomposition results for the year 2010. The raw differential shows that females are being paid higher than males by 4.3%. Once again, this gap is higher once we take into consideration their endowments. If females were being paid as males, they would be paid 6.3% higher. This points to a discrimination factor of 2%. The wage gap has increased by 1% since 2006.

Similar to 2006's result, education and experience help female employees the most. On the other hand, working in the tradable sectors and experience disfavors female employees the most, in terms of their wages.

Table 17: Summary of decomposition results: 2010

Mean prediction of male wages	7.016
Mean prediction of female wages	7.060
Raw differential (female-male)	0.043
- due to endowments (E)	0.063
- due to coefficients (C)	-0.027
- due to interaction (CE)	0.007

Table 18: Decomposition results for variables: 2010

Variables	(E)	(C)	(CE)
trade	0.009	-0.007	0.002
age	-0.082	0.567	-0.042
agesq	0.053	-0.313	0. 044
cpa	-0.004	0.001	-0.000
tenure	-0.015	0.018	-0.003
edu	0.104	0.026	0.006
admin	-0.003	0.003	-0.000
occ	yes	yes	yes
firm	yes	yes	yes
industry	yes	yes	yes
Constant	0.000	-0.320	0.000
Total	0.063	-0.027	0.007

From table 19, we see that from 2010 to 2014, the gender wage gap increased by 3.9%. The mean prediction of the log of female wages if 7.42 and of the male wages is 7.45, giving a raw differential of 3.9% in favor of male employees. However, if endowments were taken into consideration, male employees should actually be earning 2% less than female employees. There are unknown factors pushing male wages up by 5.9%.

The second column of table 20 show that age, tenure and holding an administrative position are the variables that are helping male employees the most. Similar to the results of table 10, the third column reveals that experience contributes the most to the negative discrimination against women. To a smaller extent, working in the tradable sectors also contributes to the gender wage gap present.

Table 19: Summary of decomposition results: 2014

Mean prediction of male wages	7.453
Mean prediction of female wages	7.415
Raw differential (male-female)	0.039
- due to endowments (E)	-0.020
- due to coefficients (C)	0.054
- due to interaction (CE)	0.005

Table 20: Decomposition results for variables: 2014

Variables	(E)	(C)	(CE)
trade	-0.002	0.005	0.003
age	0.089	-0.223	-0.017
agesq	-0.063	0.128	0.020
cpa	0.005	-0.001	-0.001
tenure	0.021	-0.024	-0.006
edu	-0.083	-0.040	0.006
admin	0.013	-0.001	-0.000
occ	yes	yes	yes
firm	yes	yes	yes
industry	yes	yes	yes
Constant	0.000	0.209	0.000
Total	-0.020	0.054	0.005

These decomposition results all show that working in the tradable sectors worsen female wages. In addition, the gender wage gap increased more from the period of 2010 to 2014 than it did in the period of 2006 to 2010. The possible reasons why this may be so is a rich area for future discussion.

Although the period of 2006 to 2010 covers a recession in Turkey in 2009, the increase in gender wage gap is very small. As for the period after 2010, one major event that took place in Turkey was the large and sudden influx of Syrian refugees. In a recent report by The International Rescue Committee, it is found that among six countries which host 40% of the world's refugee population (Turkey, Uganda, Lebanon**,** Jordan, Germany, and the U.S.), Turkey has the highest gender wage gap between refugee women and host men (Kabir & Klugman, 2019). If there is a case of a replacement of local female workers with refugee female workers with not much change in the male workers side, there could lead to an increase in the wage gap. However, to go further

with this argument, demographic data is needed to see whether the makeup of employees in the manufacturing sector has changed or not.

CHAPTER FIVE

CONCLUSION

The principal objective of this thesis is to investigate the overall gender wage gap in Turkey's manufacturing industry and analyze whether international trade has any effect on it. Furthermore, it investigates the gender wage gap over the years 2006, 2010, and 2014. This study uses individual-level data on worker and firm characteristics from the Structure of Earnings Survey (SES), which is conducted by the Turkish Statistical Institute (TURKSTAT). It covers three years: 2006, 2010, 2014, and includes 659,952 observations. From this data set, we only focused solely on the industries under the manufacturing sector.

In order to study the gender wage gap present in Turkey's manufacturing sector, we utilize the Blinder-Oaxaca's decomposition to estimate the portion of the gender wage gap due to discrimination. We control for several labor and firm characteristics that normally affect wages, such as education and experience. Our results show that there is a raw differential of 3.9% in favor of women. However, when individual labor market characteristics are taken into account, female employees should be earning 6.5% more than men, most likely due to their higher average educational attainment and occupation. Therefore, we found that there exists a gender wage gap of 2.6% in Turkey's manufacturing sector due to discrimination.

Consequently, we apply the Blinder-Oaxaca decomposition on the tradable and non-tradable sectors separately to analyze the effect of international trade on the gender wage gap. We discovered a higher gap in the tradable sectors. The decomposition results show a gender wage gap in the tradable sectors of 4.2% while in the non-tradable sectors it is 3.2%. This was in contrast to our expectations.

To further our quantitative analysis, we perform an OLS regression to analyze the gender wage gap in both the tradable and non-tradable sectors. In order to compare the gender wage gaps within the two sectors, we form two dummy variables, female and trade, and interacted the two to get four categories: 1-Female-trade: the female employees in the tradable sectors. 2-Male-trade: the male employees in the tradable sectors. 3-Female-non-trade: female employees in the non-tradable sectors. 4-Male-

non-trade: It is the constant and represents male employees in the non-tradable sectors. We then compare the gender wage gap between male and female in the tradable sectors and male and female in the non-tradable sectors. We run four different models. The fourth model includes the complete list of the control variables: age, age squared, tenure, education level, collective bargaining coverage, administrative responsibility, occupation, firm size, and industry. The fourth model is used as a benchmark. The regression results reveal that the gender wage gap in the tradable sectors is around 3.3%, while in the non-tradable sectors, it is 1.9%.

We conclude that, in contradiction to Becker's theory, the gender wage gap in Turkey's manufacturing sector is higher in the tradable sectors than in the non-tradable sectors. This points to the idea that international trade increases the gender wage gap. However, there could be other factors present in the structure of the tradable sectors that have a role in this and we cannot conclusively say that only international trade is responsible for the higher gender wage gap in the tradable sectors.

Furthermore, applying the decomposition on the three years separately, show an increase of the gender wage gap over the years, especially after 2010. The decompositions also show that in all three years, working in the tradable sectors is consistently related to worsening the female wages.

Future research is needed to study through what mechanisms does international trade worsen the gender wage gap. Policy suggestions would be to promote a culture of salary transparency and provide social support for working mothers, as well as subsidies for those companies that accommodate to working mother.

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APPENDIX

1. Basic monthly salary: Basic monthly wage * (30/ number of paid days in a month)
2. Age: Full-time, working population from ages 15 to 65.
3. Agesq: It is the age squared. It takes into account the potential diminishing effect of age on wages.
4. CPA: It stands for collective pay agreement. It controls the effect of employee bargaining power.
5. Tenure: It is the employee's tenure in his/her current job to account for firm-specific experience.
6. Edu: It is a continuous variable representing educational attainment. Its categories are:1- Primary school and below 2- Primary education and secondary school 3- High school 4- Vocational high school 5- Higher education
7. Admin: It represents administrative or supervisory responsibility. It is included to control for higher wages as a result of higher degree of autonomy at work thought to be as a result of holding administrative responsibility (Aydiner-Avsar, 2014).
8. Year: To control for any major policy changes taking place within the years 2006 to 2014
9. Occ: It stands for occupation. Its categories are: 1-Managers 2-Professionals 3-Technicians and associate professors 4-Clerk, services, and sales 5-Crafts and trade 6-Operator 7-Low-skilled service
10. Firm: It is the firm size. Its categories are: 10-49, 50-249, 250-499, 500-999, 1000
11. Industry: It is the different industries included in the manufacturing sector. See Table 2. For the year 2006, the industries are classified according to the NACE rev 1, and for 2010 and 2014 it is according to NACE rev 2.

12. Female-trade: Female employees working in the tradable sectors

13. Male-trade: Male employees working in the tradable sectors

14. Female-non-trade: Female employees working in the non-tradable sectors

15. Male-nontrade: Male employees working in the non-tradable sectors.