**Wage Discrimination in Germany Between Turkish Immigrants and German Natives: An Empirical Analysis of Labor Market Outcomes of Turkish Immigrants**
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## I.        Introduction

Racial tensions still persist today in Germany, despite some progress over the years. Turkish immigrants have been coming to Germany, seeking work and opportunity, since the 1960s. At this time, Turkey and West Germany had signed a labor recruitment agreement in efforts to diminish the incredibly large demand for workers after the Berlin Wall fell. These "guest workers" were hired to complete industrial jobs, and therefore are considered unskilled and uneducated in the German labor market. The promise given by the German government was that these Turkish guest workers would boost national tax revenues and increase the country's productivity levels. However, for many years after, Germans believed that these guest workers would return home after their employment finished (Spiegel, 2010). This was not the case.

Now in the 2000s, Turks make up roughly three million of Germany's total population of eighty billion people, making them the largest ethnic majority in Germany. Even more, Turks have an unemployment rate that is almost double that of native Germans, 10.4 percent against 6.4 percent respectively, attributable to educational differences, lack of education and assimilation problems. According to the German General Social Surveys from 1980 to 2002, the majority of respondents, roughly 64%, believed that there should be more restrictions placed on the inflow of immigrants to Germany, regardless of their nationality or circumstances. Many Germans consider their country's lack of a proper immigration policy led them to today's integration issues. In fact, the majority of German natives believe that the increasing signs of tensions in Turkey are now being brought to Germany (Kern, 2016).

In this paper, I will be studying whether there is wage discrimination in the German labor market between Turkish immigrants and German natives. Discrimination can be seen in various areas of labor, from applying to jobs to getting promoted. Statistically measuring the discrimination within a country can be quite difficult, however previous empirical studies have measured inequality cross-ethnically or racially for individuals by using information on each group's human capital, based upon their education level and work experience.

This study will decipher how much of the German-Turkish wage differential is attributable the following variables: educational attainment, work experience, ethnicity and occupational industry. The theories behind labor market discrimination explain that it both lowers the wages of the 'minority' group as well as increases the wages for the 'majority' group. I will use micro data from the German Socio-Economic Panel to explore the possible wage discrimination in the German labor market between Turkish immigrants and German natives.

## II.    Literature Review

*3.A. Discrimination Theory*

Much of the empirical work that has been completed on wage discrimination for different races has measured whether and how much discrimination actually exists. The first economist to study racial discrimination was Gary Becker (1957), whose analysis would frame race discrimination within a market context, using the framework to analyze and identify reasons for the African American-white wage differential in the United States. He found both a definition for wage discrimination as well as suggested how wage discrimination operates in the labor market. Becker developed four models of discrimination: taste for discrimination, statistical discrimination, overcrowding model, and institutional model. Taste for discrimination is when individuals feel and act as though there is a cost for associating with a particular group, for example if an employer did not hire a specific race because they thought it will hurt their business. Similarly, statistical discrimination is when an individual is clumped into a perceived group and that group's average determines how that individual will be treated. The overcrowding model is when there is 'crowding' into lower wage jobs because of discriminatory preferences or lack of alternative opportunities. Finally the institutional model describes every day, operational inequality within a firm in its productivity, promotional opportunities and pay. In total, Becker modeled and measured discrimination as a personal preconception or bias against a particular group (Becker, 2010).

Since Becker's theory, there have been countless theories on labor market discrimination produced. These theories rationalize how discrimination not only lowers the wages of the minority group, but it also induces higher wages for the majority group. Theories, such as human capital investment and economic discrimination, indicate that differences in the average wages of racial groups exist because of differences in skill levels or productivity characteristics. As a result of these theories, it has been proven that discrimination has both consequences for the group being discrimination against and for the group that is using discrimination. For example, when discrimination diminishes the wages of Turkish immigrants relative to those of similarly qualified German natives, the discriminator would have to pay higher wages to the German natives employees if he wishes not to employee Turkish immigrant employees. This results in the Turkish immigrant employee getting paid less and the employer having to pay a larger sum to acquire the same amount of productivity. Becker defined a competitive market discrimination coefficient for labor of different productivity as the difference between their observed wage ratio and the wage ratio that would exist in the absence of discrimination (Becker, 2010).

*3.B. Empirical Evidence*

The most relevant work to my study was completed by Alan Blinder (1973) and Ronald Oaxaca (1973). Alan Blinder found that regressions could explain the wage gap between white males, African American males and white females by analyzing the wage differential between African American men and white men as well as white men and women. As wage differentials can be explained by differences in unbiased characteristics, such as educational attainment and work experience, it can also be unexplained by biased characteristics, such as race, ethnicity, and sex. Blinder found that using a decomposition of wage differentials, he could measure how much of

the white-black wage gap was attributable to the higher education of whites and how much of the female-male wage gap was attributable to men having easier entree to high-paying professions. Moreover, Blinder developed a simple technique to quantify how much of wage differential can be attributed to objective traits versus discrimination (Blinder, 1973). Similarly, Oaxaca studied the male-female wage differentials in urban labor markets to see how restrictive culture, tradition, and discrimination are on women's participation in the labor force. He found the same results as Blinder: there must be a decomposition of wage differential in order to find the amount attributable to wage discrimination and the amount attributable to objective traits. When summarizing these two economists' models, their generalized model together is what forms the Blinder-Oaxaca Decomposition (Oaxaca, 1973).

Bertrand and Mullainathan (2004) discrimination in the labor market of Chicago and Boston between whites and African Americans. They examine discrimination in wage for six occupation categories: executives and managers, administrative supervisors, sales representatives, sales workers, secretaries and legal assistants, and clerical workers; they find statistically significant evidence of discrimination is the same across all. In conclusion, the authors find that a race-blind selection rule would generate equal treatment of whites and African-Americans, therefore implying that employers utilize race as a factor when reviewing resumes.

Ahmed and Hammarstedt's (2008) work provides a thorough examination of the discrimination of the rental housing market in Sweden when comparing men, women and a minority group. More specifically, they compared the difference between callback rates from identical rental requests between a native Swedish woman, a native Swedish man and an Arabic immigrant man. They found significant statistical evidence of discrimination in the Swedish rental housing market, favoring the female native above all and the native male above the immigrant male.

Leo and Manger (2012) examine ethnic discrimination in Germany's labor market for student internships. They focus on the discrimination between German natives and immigrated Turkish individuals, both of which are equally qualified for the internships they apply. The results find that all firms, especially smaller firms, discriminate against non-natives until presented with reference letters proving these individuals are efficient in their work. Weichselbaumer (2016) investigates discrimination against native women and migrant women and finds that female migrants wearing headscarves are discriminated against the most. The difference between the callbacks for employment opportunities for these three women is statistically significant, where the candidate with the headscarf had to send 4.5 times as many applicants has an identical application with a German name and no headscarf to receive the same number of callbacks for an interview.

## III.    Theories

The theories behind this paper are the human capital model, wage model and the Blinder-Oaxaca model. Theoretically and according to the human capital model, we assume that people with more skills and higher education will get a higher wage because they are more productive. We would also assume that workers who have equivalent human capital and productivity would be paid the same wage. So why does wage discrimination exist in the labor markets?

Becker explained that when there is an absence of discrimination and assuming that the two groups being observed, in this case German natives and Turkish immigrants, are equally productive, then we can assume that these workers are perfect substitutes, as shown in the following graph:
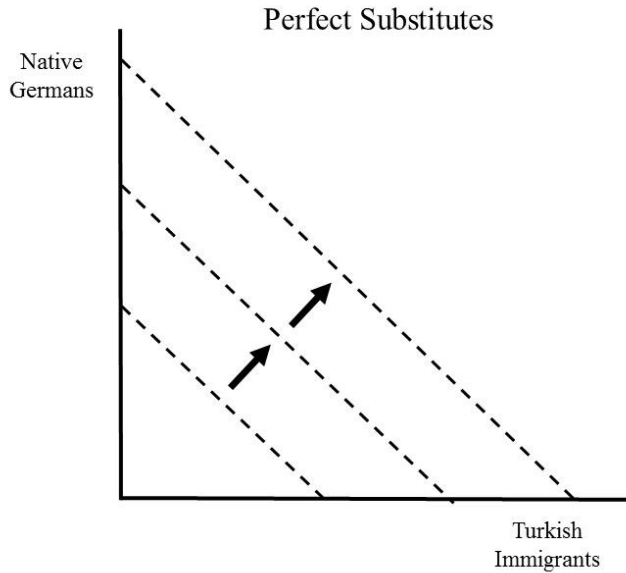


He also defined the market discrimination coefficient, β, as the percentage wage differential between two types of perfectly substitutable labor. When the two "goods" or groups are not perfect substitutes, then the discrimination coefficient is the difference between the observed wage ratios in the absence of discrimination (Oaxaca, 1973). Additionally, the Blinder-Oaxaca economic model explains that workers who have equal productivity will receive equal compensation and if not, it can be decomposed into either measureable reasons or unmeasurable reasons (Oaxaca, 1973).

Therefore, in order to study labor market outcomes by ethnicity, I will use two linear regression models, as shown below:

$$Y_G = \alpha_G + \beta_G X_G + \varepsilon_G, \textit{if German}$$
$$Y_T = \alpha_T + \beta_T X_T + \varepsilon_T, \textit{if Turkish}$$

We can assume that "Y" is explained by various factors, X, hence the greater the value of X, the greater the value of the output, Y. The gap between the wage equations, shown in the following graph, is equal to $E(Y_G - Y_T)$:
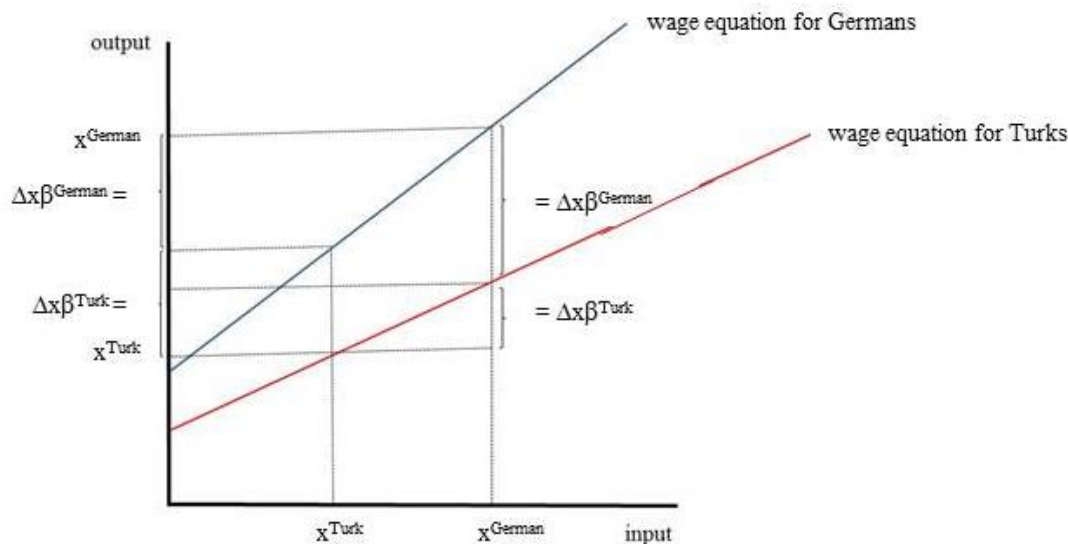
Therefore the estimated difference in wage between the groups can be decomposed even further (Jann, 2008):

$$E(Y_G - Y_T) = \beta_G X_G - \beta_T X_T + \varepsilon_G - \varepsilon_T + \beta_G X_T - \beta_G X_T$$
$$where, \Delta X = X_G - X_T \text{ and } \Delta\beta = \beta_G - \beta_T$$
$$E(Y_G) - E(Y_T) = \beta_G(X_G - X_T) + X_T(\beta_G - \beta_T)$$

*Where, $(X_G - X_T)$ = measureable characteristics and $(\beta_G - \beta_T)$ = unmeasurable characteristics.*

In this decomposition, the differences in the X's are weighted by the coefficients of the German group and the differences in the coefficients are weighted by the X's of the Turkish group. Moreover, by decomposing wage discrimination, it is easier to divide the gap in wages between Germans and Turks into a part attributable to measurable characteristics and a part attributable to unmeasurable characteristics (Jann, 2008). In other words, the differences in the explained component could be due to differences in educational attainment; for example if one group has a higher level of educational attainment, then they are more likely to have explained higher wages. Whereas immeasurable characteristics cannot be attributed to differences in the factors being examined, and therefore provide no information as to why there could be a wage gap. This means that when immeasurable characteristics are large and significant, there is evidence of discrimination (O'Donnell, 2008).

I will examine the following factors that can impact an individual's wage: educational attainment, work experience (age), industry, etc. According to a study by the University of Plymouth, age is a powerful predictor for work experience and job performance (Hoskins, Newstead, Dennis, 1997). Therefore, to measure work experience, I will use age as a proxy.

## IV.    Data Description

The panel data used to test these hypotheses come from the German Socio-Economic Panel. Moreover, the variables collected in this data include household composition, employment, occupations, earnings, and health and satisfaction indicators. I will be using generated and biological compositions, which includes information on the individual's age, educational

attainment, occupational industry, wage, nationality, and whether they are fulltime employees, to test for wage discrimination.

These data come from a longitudinal survey of approximately 11,000 private households in the Federal Republic of Germany from 1984 to 2014, and eastern Germany from 1990 to 2014. Furthermore, the sample used in this study spans the years 1985-2014. In year 1985 there were 11,654 individuals being interviewed, which grew to 26,682 individuals in 2014.

The dependent variable, wage, is the respondent's current gross labor income in euros per month. In this study, I am specifically examining the wage of fulltime employees who are between the ages of 25 and 65.[i]

The variable nationality describes the individual's citizenship. Because the survey did not have an ethnicity variable, I used nationality as a proxy. This variable is designed to integrate the information on the respondent's nationality over a period of time when perhaps he or she gained a German citizenship, thus indicating assimilation. For the purpose of this study I created three nationalities: German, Turkish and other. By generating these three nationalities, one can compare the differences in wage between Germans and non-Germans, more specifically Turkish immigrants. Additionally, using the variable nationality, we can compare differences in wage if the individual changes nationality to German.

As this is a wage discrimination model, I will control for educational attainment and vocational training/apprenticeship. The variable education has six options: inadequately, general elementary, middle vocational, vocational plus Abitur[ii], higher vocational and higher education. In order to make the educational degrees and diplomas attained in different countries comparable, because not all individuals surveyed have equivalent educational backgrounds, these options take into account degrees and diplomas attained in both general schooling and vocational and university education. In Germany, jobs that do not require a college degree are highly respected, such as chefs, electricians, welders, carpenters, etc. This is because they believe learning a trade is just as valuable as a college education. Below is breakdown of the six categories of educational attainment, according to the UK-German Connection:

(1) *Inadequately*: insufficient education
(2) *General elementary*: graduated from secondary level schooling, where they are prepared to go into vocational training, start entry-level work in the public sector, or attend a full-time vocational school[iii]
(3) *Middle vocational*: graduated from secondary level schooling, where they are prepared to do in-company vocational training, work in the public sector at entry and executive level, or further his or her education at secondary level II school[iv]
(4) *Vocational + Abitur*: received the general qualification or "leaving certificate"[v] for university entrance after graduating middle vocational schooling
(5) *Higher vocational*: received higher professional graduation[vi]
(6) *Higher education*: university graduate

Finally, the variable industry includes 65 different sectors. This variable is aligned with the Statistical Classification of Economic Activities in the European Community, meaning that the industries are aligned across all European countries.

*4. A. Summary Statistics*

The summary statistics for wage are adjusted to include only fulltime employed individuals between the ages of 25-65 with a wage greater than 500 euros. Additionally, I took the natural logarithm of wage in order to fit the variable into the model by making the coefficients percentages. Shown in Figure 1, the total summary statistics for wage, the minimum monthly wage is 501 euros and the maximum monthly wage is 101,708 euros. The average monthly income for the sample was 3,374.55 euros. The average age of workers is 43 years old. Figure 2 shows the summary statistics for Turks, where the minimum monthly wage is 550 euros and the maximum monthly wage is 13,000 euros. The average monthly income for Turks is 2,368.22 euros, which is just 1,000 euros lower than that of the total sample. Moreover, the average age of working Turks in Germany is 36 years old. Illustrated in Figure 3 are the summary statistics for Germans, where the minimum monthly wage is 501 euros and the maximum monthly wage is 101,708 euros. The average monthly income for Germans is 3,402.01 euros, which is higher than both the average monthly income of Turks and the average monthly income of the entire sample. Further, the average age of Germans in the workforce is 44 years old, almost 10 years older than that of Turks. A potential reason for the average age difference between Germans and Turks could be that younger Turkish immigrants are more populous in the German labor market then older Turkish immigrants.

As shown in Figure 4, the total summary statistics for educational attainment, the majority of employed individuals – who are fulltime, between the ages of 25-65, and receive a wage greater than 500 Euros – acquire middle vocational trainings, then higher education, higher vocational, vocational plus special work experience, general elementary, and inadequate, in that order. Similarly, as Germans make up the largest portion of the total sample, they obtain similar educational attainment, where the most popular educational attainment achievement goes from middle vocational trainings, to higher education, higher vocational, vocational plus special work experience, general elementary, and inadequate, in that order. Whereas in Figure 5, the summary statistics for educational attainment of Turks, the majority of them obtain middle vocational, then general elementary, inadequate, higher education to higher vocational, in that order. The largest difference between Turkish and German educational attainment is that Turks have a significantly lower amount of vocationally trained individuals and higher educated individuals.

**Figure 1. Total Summary Statistics for Wage**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|----------|-----|------|-----------|-----|-----|
| **ln wage** | 83129 | 7.96332 | 0.536663 | 6.216606 | 11.52986 |
| **wage** | 83129 | 3374.548 | 2614.685 | 501 | 101708 |
| **age** | 83129 | 43.41778 | 9.799748 | 25 | 65 |
| **Turkish** | 83129 | 0.011272 | 0.105569 | 0 | 1 |
| **other** | 83129 | 0.039493 | 0.194766 | 0 | 1 |

**Figure 2. Summary Statistics for Wage for Turks**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **ln wage** | 937 | 7.68786 | 0.391458 | 6.309918 | 9.472705 |
| **wage** | 937 | 2368.215 | 1128.798 | 550 | 13000 |
| **age** | 937 | 36.13447 | 7.445604 | 25 | 62 |
| **Turkish** | 937 | 1 | 0 | 1 | 1 |
| **other** | 937 | 0 | 0 | 0 | 0 |

**Figure 3. Summary Statistics for Wage for Germans**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **ln wage** | 78909 | 7.971403 | 0.536978 | 6.216606 | 11.52986 |
| **wage** | 78909 | 3402.069 | 2639.388 | 501 | 101708 |
| **age** | 78909 | 43.59442 | 9.78004 | 25 | 65 |
| **Turkish** | 78909 | 0 | 0 | 0 | 0 |
| **other** | 78909 | 0 | 0 | 0 | 0 |

**Figure 4. Total Summary Statistics for Educational Attainment**

| ISCED-1997-Classification | Freq. |
|---|---|
| [1] (1) Inadequately | 692 |
| [2] (2) general elementary | 5,159 |
| [3] (3) Middle Vocational | 37,675 |
| [4] (4) Vocational Plus Abi | 6,351 |
| [5] (5) Higher Vocational | 7,168 |
| [6] (6) Higher Education | 26,084 |

**Figure 5. Summary Statistics for Educational Attainment for Turks**

| ISCED-1997-Classification | Freq. | Average Education |
|---|---|---|
| [1] (1) Inadequately | 120 | 12.81% |
| [2] (2) general elementary | 247 | 26.36% |
| [3] (3) Middle Vocational | 408 | 43.54% |
| [4] (4) Vocational Plus Abi | 59 | 6.30% |
| [5] (5) Higher Vocational | 17 | 1.81% |
| [6] (6) Higher Education | 86 | 9.18% |

**Figure 6. Summary Statistics for Educational Attainment for Germans**

| ISCED-1997-Classification | Freq. | Average Education |
|---|---|---|
| [1] (1) Inadequately | 340 | 0.43% |
| [2] (2) general elementary | 4,445 | 5.63% |
| [3] (3) Middle Vocational | 36,125 | 45.78% |
| [4] (4) Vocational Plus Abi | 5,957 | 7.55% |
| [5] (5) Higher Vocational | 6,990 | 8.86% |
| [6] (6) Higher Education | 25,052 | 31.75% |

## V.      Empirical Model: Pooled OLS and Fixed Effects

In order to see if there is wage discrimination, I created a pooled OLS using a dummy variable to account for the different nationalities:

$$Wage_i = \alpha_i + \beta age_i + \beta educ_i + \beta industry_i + \beta survey\ year_i + \beta nationality_i + \varepsilon_i$$

We can aspect that the beta for nationality will be negative when Turks make less than Germans. However, this OLS will not tell us why it is negative. By using fixed effects and cluster, it will account for unobserved heterogeneity, such as assimilation, language skills, personality, etc.

## VI.     Empirical Model: Separate Regressions and Blinder-Oaxaca Decomposition

In order to estimate wage discrimination, I will use the following two identical wage models for Turkish employees and German employees:

(1)  Turkish: $Wage_{iT} = \alpha_{iT} + \beta age_{iT} + \beta educ_{iT} + \beta industry_{iT} + \beta survey\ year_{iT} + \varepsilon_{iT}$
(2)  German: $Wage_{iG} = \alpha_{iG} + \beta age_{iG} + \beta educ_{iG} + \beta industry_{iG} + \beta survey\ year_{iG} + \varepsilon_{iG}$

Using these regressions, the coefficients of each variable will determine the correlation they have with the wage received by Turks and Germans.

Therefore, starting with Becker's assumption that there is an absence of discrimination in perfectly competitive markets, German natives and Turkish immigrants should be perfect substitutes in their output when their productivity is equivalent. In other words, the only reason wage would be different in a perfectly competitive market when there is no discrimination would be differences in productivity characteristics. Under this assumption, the wage structure would be the following:

$$\beta^G = \beta^T = \beta^*, \text{ where } \beta^* = \text{the wage structure with absence of discrimination}$$

From this equation, the term $\beta^*$ would also be an indicator of an individual's human capital. When decomposing discrimination treatment in the labor market, it must be assumed that $\beta^*$ is a linear function of $\beta^G$ and $\beta^T$, the wage structures for German natives and Turkish immigrants.

Becker defined a competitive market discrimination coefficient for labor of different productivity as the difference between their observed wage ratio and the wage ratio that would exist in the absence of discrimination. This means that in the absence of discrimination, all individuals, regardless of group, would be paid in respect to their productivity. In other words, this would imply that any wage differentials should be due to differences in productivity levels only (Jann, 2008).

*7.A. Decomposition*

In addition to using my pooled regression models to measure for wage discrimination, I will also be using the Blinder-Oaxaca technique. This technique divides the wage gap between two groups into either measurable differences, which can be explained by differences in determinants of wages, such as education or work experience, or immeasurable differences, which cannot be explained by these differences. Furthermore, the Blinder-Oaxaca decomposition decomposes the percentage effect each variable – educational attainment, age (work experience), industry – has on that group's wage. Blinder and Oaxaca (1973) illustrated this difference in percentage terms:

$$\text{Discrimination} = \frac{(W^G/W^T)-(MP^G/MP^T)}{(MP^G/MP^T)}$$

where $(W^G/W^T)$ is the observed German-Turkish average wage ratio and $(MP^G/MP^T)$ is the ratio of the German-Turkish average marginal products, which by assumption in the average wage ratio in the absence of discrimination. Therefore, separate wages or earnings regressions could be estimated for individuals of each group: minority versus majority (Jann, 2008).

Another assumption that must be made is that the wage structure will be more closely aligned with the German native wage structure instead of the Turkish immigrant wage structure, which consists of weighting the structures differently. By weighting the German native and Turkish immigrant wage structures by the respective proportions of Germans and Turks in the labor force, the estimation of the wage structure will be more accurate. Therefore, the new wage structure under this assumption would be the following:

$$\beta^* = f_G\beta^G + f_T\beta^T, \text{ where } f_G \text{ and } f_T \text{ are the weighted proportions}$$

By using the Blinder-Oaxaca decomposition, I will be able to determine how much of the difference in mean output between German natives and Turkish immigrants is attributable to the differences in the size of regression coefficients. The Blinder-Oaxaca decomposition is a threefold composition that breaks down measurable and immeasurable factors into endowments, coefficients, and interaction, shown below (Hlavac, 2014):

$$\Delta Y = \underbrace{(X_G - X_T)\,\beta_T}_{\text{endowments}} + \underbrace{X_T\,(\beta_G - \beta_T)}_{\text{coefficients}} + \underbrace{(X_G - X_T)\,(\beta_G - \beta_T)}_{\text{interaction}}$$

The endowments term signifies the immeasurable differences between the two groups, coefficients term explains the measurable differences between the two groups, and the interaction term explains the difference between the endowments and the coefficients.

## VII.    Results

*8.A. Pooled OLS and Fixed Effects*

With the German labor statistics exhibiting that German natives receive a higher wage than Turkish immigrants, I wanted to determine whether this wage gap was due to wage discrimination or for other reasons that could be measurably found. In OLS regression, Turks receive 2.8% less wage than Germans at a significant 10% value, as shown in Figure 7.

However when using clustered fixed effects, in Figure 8, you can see that having a Turkish nationality decreases wages by 7.5%. This implies that once Turks become nationalized, their wage should increase by 7.5%. Additionally, this explains that assimilation, language, and other unobserved heterogeneity impacts the German-Turkish wage gap, increasing it by 4.7%. However some caution must be taken because the P-value is not significant at a 10% value, although it is very close.

**Figure 7. Pooled OLS**

| lnwage | Coef. | Std. Err. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| educ | | | | | | |
| 2 | 0.067955 | 0.018341 | 3.71 | 0 | 0.032007 | 0.103902 |
| 3 | 0.098633 | 0.017542 | 5.62 | 0 | 0.064251 | 0.133016 |
| 4 | 0.20856 | 0.018287 | 11.4 | 0 | 0.172718 | 0.244403 |
| 5 | 0.295151 | 0.018213 | 16.21 | 0 | 0.259453 | 0.330849 |
| 6 | 0.561606 | 0.017695 | 31.74 | 0 | 0.526923 | 0.596289 |
| | | | | | | |
| **Turkish** | -0.0288 | 0.015004 | -1.92 | 0.055 | -0.05821 | 0.000612 |
| **other** | -0.03828 | 0.00815 | -4.7 | 0 | -0.05426 | -0.02231 |
| **age** | 0.042651 | 0.001355 | 31.48 | 0 | 0.039995 | 0.045306 |
| **age2** | -0.00036 | 1.54E-05 | -23.41 | 0 | -0.00039 | -0.00033 |

**Figure 8. Clustered Fixed Effects**

| lnwage | Coef. | Std. Err. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| **educ** | | | | | | |
| **2** | -0.12788 | 0.043534 | -2.94 | 0.003 | -0.21321 | -0.04255 |
| **3** | -0.12739 | 0.044066 | -2.89 | 0.004 | -0.21377 | -0.04102 |
| **4** | -0.10367 | 0.047567 | -2.18 | 0.029 | -0.1969 | -0.01043 |
| **5** | -0.076 | 0.045493 | -1.67 | 0.095 | -0.16517 | 0.013169 |
| **6** | 0.001247 | 0.053617 | 0.02 | 0.981 | -0.10385 | 0.106342 |
| | | | | | | |
| **Turkish** | -0.07543 | 0.048318 | -1.56 | 0.119 | -0.17014 | 0.019282 |
| **other** | 0.003201 | 0.029256 | 0.11 | 0.913 | -0.05414 | 0.060545 |
| **age** | 0.08554 | 0.002408 | 35.53 | 0 | 0.080821 | 0.09026 |
| **age2** | -0.00047 | 2.69E-05 | -17.55 | 0 | -0.00053 | -0.00042 |

*8.B. Separate Regressions and the Blinder-Oaxaca Decomposition*

By running separate regressions, we can determine the differences in educational attainment and work experience between Turks and Germans. For example, there are many instances where workers with less education but more work experience earn as much as workers with more education but less work experience. Through multiple regression, I can decompose each variable's independent effect on the wages of Turks and Germans and see whether there actually is wage discrimination. Although there seemed to be no to minimal wage discrimination using pooled OLS and fixed effects, I will use separate regressions and the Blinder-Oaxaca decomposition to determine the weighted differentials of each group.

I used the standard application of the Blinder-Oaxaca technique in Figure 11. This technique allows the analyzer to divide the wage gap between the two groups being investigated into measurable differences and immeasurable differences. Specifically, it decomposes the model into endowments (e.g., average differences in education), coefficients (difference in treatments), and interaction (combination of endowments and coefficients). The endowments are measurable differences and the sum of the coefficients and interaction terms are unmeasurable differences. In my sample, the mean of log hourly wages (lhrwage) is 7.97 for Germans and 7.69 for Turks, yielding a wage gap of 0.28. This means that on average, Turks are making 30% less than German nationals.

The endowments section illustrates the mean increase in Turks' wages if they had the same characteristics as Germans. Differences in endowments accounts for 30.9% (.087/.284) of the wage gap. For example, Turks have lower average educations than Germans, shown in Figures 5 and 6. Although both Turks and Germans have around 44% graduating with middle vocational educations, Germans have 30.87% more individuals graduating with degrees above middle vocational than Turks. Moreover, Turks have 33.11% more individuals graduating with degrees less than middle vocational or with inadequate education than Germans. In addition, Turks are younger than Germans. Taken together, the older you get, the higher your wage becomes, and,

because Turkish immigrants are younger and have less educational attainment than Germans, they have lower wages.

The second section, coefficients, measures the change in Turks' wages when applying the German's coefficients to the Turks' characteristics, accounting for 16% of the wage gap. For example, as you can see in Figure 9 and Figure 10, the coefficient on higher education (bachelor's degree) for Germans is larger than those for Turks, 0.37 versus 0.24. This indicates that Germans and Turks are treated differently, and thus are being rewarded differently for their educational attainment.

Finally, the interaction term measures the simultaneous effect of differences in endowments and coefficients, accounting for 53% of the wage gap. Making up the largest portion of the wage gap, the interaction term illustrates that there are measurable differences between Turks and Germans, but if the Turks were to have the same abilities as the Germans, the German labor market would still not reward them equally.

There is statistically significant evidence of wage discrimination in the German labor market for Turkish immigrants (4.5%). However is this economically significant? I would argue that this is not economically significant, yet a 4.5% wage differential over an entire lifetime could be considered economically significant.

**Figure 9. German Decomposition**

| lnwage | Coef. | Std. Err. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| **educ1** | -0.21638 | 0.036886 | -5.87 | 0 | -0.28868 | -0.14409 |
| **educ2** | -0.14059 | 0.027766 | -5.06 | 0 | -0.19501 | -0.08617 |
| **educ3** | -0.12156 | 0.02699 | -4.5 | 0 | -0.17446 | -0.06866 |
| **educ4** | 0.041897 | 0.027537 | 1.52 | 0.128 | -0.01207 | 0.095869 |
| **educ5** | 0.090903 | 0.027461 | 3.31 | 0.001 | 0.037079 | 0.144727 |
| **educ6** | 0.372494 | 0.027051 | 13.77 | 0 | 0.319474 | 0.425514 |
| **age** | 0.048852 | 0.001443 | 33.85 | 0 | 0.046023 | 0.051681 |
| **age2** | -0.00043 | 1.63E-05 | -26.3 | 0 | -0.00046 | -0.0004 |
| **syear** | 0.011389 | 0.000342 | 33.32 | 0 | 0.010719 | 0.012059 |
| **industry** | -0.00093 | 7.12E-05 | -13.05 | 0 | -0.00107 | -0.00079 |
| **_cons** | -16.1735 | 0.684114 | -23.64 | 0 | -17.5144 | -14.8327 |

**Figure 10. Turkish Decomposition**

| lnwage | Coef. | Std. Err. | t | P>t | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| educ1 | -0.11422 | 0.093308 | -1.22 | 0.221 | -0.29734 | 0.068893 |
| educ2 | -0.07128 | 0.090147 | -0.79 | 0.429 | -0.2482 | 0.105626 |
| educ3 | 0.103644 | 0.088681 | 1.17 | 0.243 | -0.07039 | 0.277679 |
| educ4 | 0.073019 | 0.099692 | 0.73 | 0.464 | -0.12262 | 0.268662 |
| educ5 | 0.463338 | 0.125094 | 3.7 | 0 | 0.217843 | 0.708832 |
| educ6 | 0.238581 | 0.096597 | 2.47 | 0.014 | 0.049011 | 0.428151 |
| age | 0.046649 | 0.013568 | 3.44 | 0.001 | 0.020022 | 0.073277 |
| age2 | -0.00059 | 0.000173 | -3.41 | 0.001 | -0.00093 | -0.00025 |
| syear | 0.009717 | 0.002409 | 4.03 | 0 | 0.00499 | 0.014444 |
| industry | -0.00155 | 0.000523 | -2.96 | 0.003 | -0.00258 | -0.00052 |
| _cons | -12.6643 | 4.753229 | -2.66 | 0.008 | -21.9924 | -3.3362 |

**Figure 11. Blinder-Oaxaca Decomposition Threefold**

| lnwage | Coef. | Std. Err. | z | P>z | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| **overall** | | | | | | |
| German | 7.970765 | 0.001908 | 4178.28 | 0 | 7.967026 | 7.974504 |
| Turkish | 7.686779 | 0.012796 | 600.74 | 0 | 7.661701 | 7.711858 |
| difference | 0.283986 | 0.012937 | 21.95 | 0 | 0.25863 | 0.309342 |
| endowments | 0.087635 | 0.022347 | 3.92 | 0 | 0.043835 | 0.131435 |
| coefficients | 0.045537 | 0.013701 | 3.32 | 0.001 | 0.018682 | 0.072391 |
| interaction | 0.150814 | 0.022829 | 6.61 | 0 | 0.106071 | 0.195558 |
| **endowments** | | | | | | |
| educ1 | 0.013862 | 0.01139 | 1.22 | 0.224 | -0.00846 | 0.036187 |
| educ2 | 0.014437 | 0.018285 | 0.79 | 0.43 | -0.0214 | 0.050274 |
| educ3 | 0.002989 | 0.003055 | 0.98 | 0.328 | -0.003 | 0.008976 |
| educ4 | 0.00098 | 0.001456 | 0.67 | 0.501 | -0.00187 | 0.003834 |
| educ5 | 0.03264 | 0.009045 | 3.61 | 0 | 0.014912 | 0.050368 |
| educ6 | 0.053972 | 0.021967 | 2.46 | 0.014 | 0.010917 | 0.097027 |
| age | 0.350684 | 0.102628 | 3.42 | 0.001 | 0.149536 | 0.551832 |
| age2 | -0.37607 | 0.110887 | -3.39 | 0.001 | -0.59341 | -0.15874 |
| syear | 0.011849 | 0.003395 | 3.49 | 0 | 0.005196 | 0.018502 |
| industry | -0.0177 | 0.006088 | -2.91 | 0.004 | -0.02964 | -0.00577 |

| coefficients | | | | | | |
|---|---|---|---|---|---|---|
| educ1 | -0.01284 | 0.012655 | -1.01 | 0.31 | -0.03764 | 0.011966 |
| educ2 | -0.01793 | 0.024416 | -0.73 | 0.463 | -0.06578 | 0.029929 |
| educ3 | -0.09621 | 0.039766 | -2.42 | 0.016 | -0.17415 | -0.01827 |
| educ4 | -0.00192 | 0.006394 | -0.3 | 0.764 | -0.01446 | 0.01061 |
| educ5 | -0.00663 | 0.002782 | -2.38 | 0.017 | -0.01208 | -0.00118 |
| educ6 | 0.012059 | 0.009118 | 1.32 | 0.186 | -0.00581 | 0.029931 |
| age | 0.079424 | 0.492012 | 0.16 | 0.872 | -0.8849 | 1.04375 |
| age2 | 0.215366 | 0.235054 | 0.92 | 0.36 | -0.24533 | 0.676063 |
| syear | 3.354876 | 4.880503 | 0.69 | 0.492 | -6.21074 | 12.92049 |
| industry | 0.028531 | 0.024237 | 1.18 | 0.239 | -0.01897 | 0.076035 |
| _cons | -3.50919 | 4.802207 | -0.73 | 0.465 | -12.9214 | 5.902961 |

| interaction | | | | | | |
|---|---|---|---|---|---|---|
| educ1 | 0.012399 | 0.012226 | 1.01 | 0.311 | -0.01156 | 0.036361 |
| educ2 | 0.014036 | 0.019128 | 0.73 | 0.463 | -0.02345 | 0.051527 |
| educ3 | -0.0065 | 0.004507 | -1.44 | 0.15 | -0.01533 | 0.002339 |
| educ4 | -0.00042 | 0.00141 | -0.3 | 0.767 | -0.00318 | 0.002345 |
| educ5 | -0.02624 | 0.00917 | -2.86 | 0.004 | -0.04421 | -0.00826 |
| educ6 | 0.030294 | 0.022728 | 1.33 | 0.183 | -0.01425 | 0.07484 |
| age | 0.016558 | 0.102575 | 0.16 | 0.872 | -0.18449 | 0.217602 |
| age2 | 0.101541 | 0.110855 | 0.92 | 0.36 | -0.11573 | 0.318813 |
| syear | 0.002039 | 0.002981 | 0.68 | 0.494 | -0.0038 | 0.007882 |
| industry | 0.007097 | 0.006046 | 1.17 | 0.24 | -0.00475 | 0.018946 |

## VIII.  Conclusion

In conclusion, there is evidence of wage discrimination between German natives and Turkish immigrants in the German labor market. The Turkish-German wage differential can be explained partially by wage discrimination (4.5%). This is not completely economically significant; however various changes could still be made to improve this wage gap. Policies could be made to place immigrants into vocational training programs, as Germany highly values vocational training. As shown in Figures 5 and 6, Turks are not or are barely receiving vocational training. Perhaps by installing a "lateral entry program" for recent immigrants to help them enter vocational training schools could help diminish this large gap. Long term, if the German policy creators do not try to reduce the wage gap, it could ultimately result in less consumer spending and increased poverty like in the United States (Vega, 2016).

There is lots of opportunity for future research to continue testing this study. One way is to add how sex affects the German-Turk wage gap. Another suggestion for further research would be to find a more understandable educational attainment variable that could be more transparent across all countries, because Germany values vocational training a lot more than other countries. Another interesting addition for future research would be to add a variable attributable to the

Syrian crisis, to measure whether the wage gap increased or decreased due to refugees fleeing their countries to Germany.

## IX.    References

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## X.    Endnotes

[1] I adjusted for observations with extremely low wages that would skew my results so that no individuals receiving a wage less than 500 euros per month were included in my analysis.

[2] Abitur is the general qualification, called a "leaving certificate", for university entrance; the Abitur is the only "school-leaving" certificate that allows the graduate to move directly to university in Germany.

[3] Individual graduated from either Hauptschule or Realschule, where students are prepared for entry level positions in the public sector or to go into vocational training.

[4] Individual graduated from either Beruflicher/Realschulabschluss or (Fach)Abitur, where students are trained in secondary level schooling.

[5] Abitur: the general qualification for university entrance in Germany.

[6] Higher professional graduation means that the student graduated from a specialized school in a specific field or study, without attending university.