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Abstract

Global problems include gender pay disparities. The gender pay gap is caused by several factors and my master's thesis will concentrate on Austria. One of the most popular arguments used to discredit the gender pay gap is the disparity in working hours. It is frequently asserted that women must earn less than males because they put in less work. This argument appears to be valid at first glance because, on average, women work fewer hours than males. Another theory that can apply is that women and men just have different levels of education. Leaving aside the fact that, on average, more women than males' complete higher education in Europe, which raises questions about the validity of the claim in and of itself. Because females take time off from work to have children and may be tempted to care for the child instead of returning to work, women simply lack expertise in a full-time job. Men are not in the same circumstances as women, whether they have children or not. Getting the necessary data is essential for the empirical analysis of this study. Data from the Statistic Austria, EU-SILC database are used to analyze the questions. The dataset contains data on wage per person that accounts for gender, age, occupation, education, length of employment, full- and part-time work, type of employment contract, area, or size of the business, among other pertinent characteristics from 2015 to the 2020 year. The master thesis will present 4 different models and explain them.

Keywords: wage gap, gender, hourly wage, wage differentials, Austria, labor market, part-time, full-time, Covid-19 pandemic

Abstrakt

Zu den globalen Problemen zählen geschlechtsspezifische Lohnunterschiede. Der geschlechtsspezifische Lohnunterschied wird durch mehrere Faktoren verursacht und meine Masterarbeit wird sich auf Österreich konzentrieren. Eines der beliebtesten Argumente zur Diskreditierung des geschlechtsspezifischen Lohngefälles ist die Ungleichheit der Arbeitszeiten. Es wird häufig behauptet, dass Frauen weniger verdienen müssten als Männer, weil sie weniger Arbeit leisten. Dieses Argument erscheint auf den ersten Blick stichhaltig, da Frauen im Durchschnitt weniger Stunden arbeiten als Männer. Eine andere anwendbare Theorie besagt, dass Frauen und Männer einfach unterschiedliche Bildungsniveaus haben. Abgesehen davon, dass in Europa durchschnittlich mehr Frauen als Männer eine Hochschulausbildung absolvieren, wirft dies Fragen zur Gültigkeit der Behauptung an sich auf. Da Frauen sich von der Arbeit freinehmen, um Kinder zu bekommen, und möglicherweise versucht sind, sich um das Kind zu kümmern, anstatt zur Arbeit zurückzukehren, fehlt es Frauen einfach an Fachwissen für einen Vollzeitjob. Männer sind nicht in der gleichen Situation wie Frauen, unabhängig davon, ob sie Kinder haben oder nicht. Für die empirische Analyse dieser Studie ist die Beschaffung der notwendigen Daten von wesentlicher Bedeutung. Zur Analyse der Fragen werden Daten aus der Datenbank Statistik Austria, EU-SILC herangezogen. Der Datensatz enthält Daten zum Lohn pro Person, die unter anderem Geschlecht, Alter, Beruf, Bildung, Beschäftigungsdauer, Voll- und Teilzeitbeschäftigung, Art des Arbeitsvertrags, Region oder Größe des Unternehmens berücksichtigen von 2015 bis zum Jahr 2020. In der Masterarbeit werden 4 verschiedene Modelle vorgestellt und erläutert.

Schlüsselwörter: Lohnunterschied, Geschlecht, Stundenlohn, Lohnunterschiede, Österreich, Arbeitsmarkt, Teilzeit, Vollzeit, Covid-19-Pandemie.

1 Introduction

In the EU, women made 13% less per hour on average in 2020 than men did. The EU nations still differ greatly from one another (Eurostat, 2020). In Austria, the gender wage gap in the beginning of the 2020s was about 18,9% (European Commission, 2020). Although women have made considerable strides in the last several decades in terms of educational and employment prospects, gender is still a factor in how much an employee makes over the course of his/her career (Blau & Kahn, 2017). Research conducted by (Furnham & Wilson, 2011) demonstrates that women continue to estimate lower incomes than men in a variety of occupations, which is significant given the fact that the gender pay gap is also found in early estimates of negotiable salaries (Furnham & Wilson, 2011).

Men and women get paid differently for the same profession for a variety of reasons (Böheim et al., 2007). Gender disparities in low-wage work have decreased in Austria during the past 20 years, notwithstanding the sector's growth in the context of substantial flexibility in restructured labor markets (Fritsch et al., 2019). Personal attributes such as formal education and relative skill scarcity drive the wage structure. The wages that arise from various endowments reflect the relative productivity of the workers. When an employer realizes that a worker is underpaid for their production, they will negotiate for a raise. Since workers have the incentive to renegotiate their pay or find a new job, wage inequalities that are unrelated to productivity differences shouldn't last over time. (Böheim et al., 2007). The gender wage gap may have narrowed among newly employed workers because in larger companies, newly hired women had more income growth than newly hired men (Böheim & Gust, 2021).

On the other side, part-time employment has grown significantly in popularity across Europe. On average, one in five workers in the EU-27 worked part-time in 2015, up from 16 percent a decade earlier, which is being supported as a means of encouraging greater harmony between work and family life (Matteazzi et al., 2017). In the EU, Austria has one of the highest percentages of women working part-time: 47.9% (EU-28:

31.1%, Eurostat 2017). The need for skilled personnel has increased as a result of skill-oriented technological advances. In the service sector, where women often work, greater demand has led to relatively higher salaries for skilled workers but lower wages for unskilled workers. The question then arises as to whether these improvements have over time resulted in more pay equality for men and women and whether there is factual support, at least for Austria, for labor market intervention based on unfair wage discrimination (Böheim et al., 2012).

According to several research, reporting information asymmetries and creating more equal compensation diminish wage inequalities in businesses (Mas, 2017). In most Western cultures, the emergence of the service sector, the deregulation of labor markets, and technological advancement are all associated with significant increases in the labor force participation of women, the value of women's human capital, and gender-congruent career paths (Fritsch et al., 2019). Wage reports do not relate wages to employee productivity. (Baker, et al., 2019).

In any case, as shown by a significant number of studies, women's incomes still lag well behind men's (Blau and Kahn 2016; European Commission 2017; Böheim et al., 2012). According to (Böheim et al., 2010) analysis, women often earn less than men and have more formal education than men, but less work experience. It is assumed that the reason for this is that women raise children and spend much more time with them than men. They confirmed that "fair" discrimination, defined as identifiable disparities in attributes, accounts for 50% of pay disparities (Böheim et al, 2010). According to a more recent study, gender-based salary discrepancies are also influenced by a number of workplace variables, including company and occupation characteristics (Kunze, 2017). However, these characteristics cannot explain the remaining part of the wage gap between men and women. However, it is possible that some of the differences are due to unfair discrimination against women. Some of these differences may be due to unobserved traits, such as attitude and commitment (Böheim et al., 2010).

I investigated how the gender wage gap had developed between 2015 and 2020, two years for which I had adequate data from the Austrian micro-census (Euro Slick from Statistik Austria 2015, 2020). In particular, I have analyzed how the gender wage gap evolved over time, occupation differences between females and males in Austria, whether or not Covid – 19 Pandemic influenced on changing the occupation of Austrian citizens, and factors that influenced the wage in Austria that affected the wage gap. I calculated pay differentials using the hourly wage in the log as the dependent variable. The model is initially estimated for 2015 only and I did it for every year, showing, in the end, the results of two years, 2015 and 2020. Both tables, one for 2015 and another one for 2020 are showing the coefficient and the standard error in parentheses below.

2 Literature Review

There are four sections in this chapter. The first section details the evolution of the gender wage gap in Austria over a five-year period, namely from 2015 to 2020, comparing the gender wage gap in Austria with other EU countries. The second section discusses the variations in occupations between men and women in Austria, which is a crucial presumption to carry out the research technique. The factors that may affect wages in Austria are discussed in the third section. Lastly, several research papers that discuss the influence of the Covid-19 pandemic on changing the occupation of people working in Austria will be studied.

2.1 Gender Wage Gap development in Austria over the period from 2015 to 2020 compared with the other EU countries

One of the highest genders pay gaps in the EU is seen in Austria. Compared with all European Union (EU) countries, Austria has 19.9% of the average gross hourly rate compared to 16.0% in the EU-28 (European Commission, 2022). Only Latvia and Estonia have a greater gender wage gap than Austria (Eurostat, 2020). The difference

between the average gross hourly earnings between women and men is represented in the following picture below.

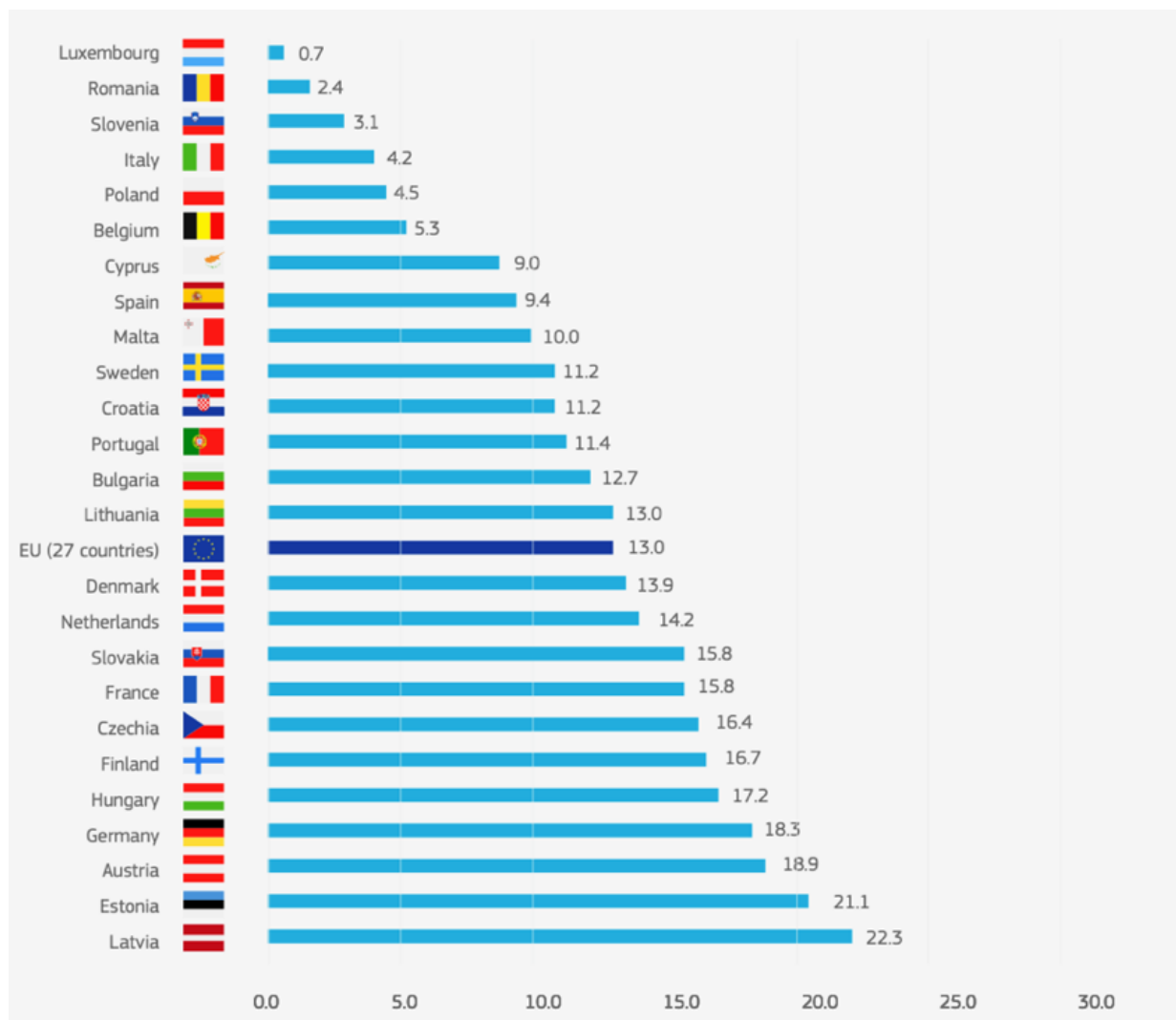


Figure 1: Gender wage gap per EU country, (European Commission, 2020)

The gender wage gap is an issue in many EU countries, as shown in Figure 1, but after examining several articles about the disparities in hourly pay between men and women as well as the statistics that are currently available, it is simple to draw the conclusion that women must work longer hours than men or have 1.5 extra months to make up the difference. In terms of formal education, Austrian women surpassed men in 1999, and today, on average, they are better educated than males. A rise in labor market participation coincided with this increase in human capital (Böheim et al., 2011). On average, women make 0.87 euros for every euro that men make (European Commission, 2020). According to Böheim et al., in 2006, women would have

earned around 8.8 log points less than men on average if men and women had precisely the same attributes. This deficit is estimated to be 5.07 log points for the year 2017. According to this, men and women are paid differently for the same observed qualities, albeit this pays disparity has decreased over time (Böheim et al., 2019). Gender Wage Gap development in the EU over the period from 2015 to 2020 is shown in the following figure.

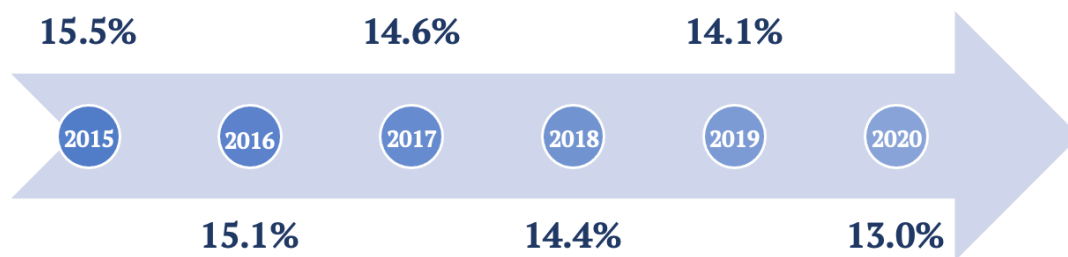


Figure 2: Gender Wage Gap Development in the EU from 2015 to 2020 (Statistic Austria, 2021)

According to Böheim et al. (2007) the gender wage gap has significantly decreased over the past two decades due to changes over the last two decades, including women's increased labor market participation, relative increases in formal and workplace-specific qualifications, and their penetration into top jobs. Political pressure for equal opportunities has also contributed to these changes (Böheim et al. 2007). Over time, women have accumulated far more experience in the labor market and, have become more comparable to males in this regard (Böheim et al., 2019). By 2017, however, women were no longer eligible for educational bonuses and were instead paid less, which contributed to a wage difference that was 1.19 log points worse (Böheim et al., 2019).

There are many causes for the shrinking gender gap. The first explanation is that more women than ever before entered the work force. Then, compared to earlier, women had a higher percentage of formal education. If all other conditions remain constant, these two factors, combined with potential technical advancements, lead to an

increase in the supply of highly trained individuals, which lowers their relative wages (Böheim et al., 2007). The adoption of laws that assisted women in catching up to men may have been one explanation for the decrease in observed and unobserved traits (Böheim et al., 2020). Still, on average, women in Austria earn significantly less than men in a full-time job every year (Statistik Austria, 2021).

2.2 Occupation differences between females and males in Austria

Men and women specialize in different fields and spend different amounts of time networking and working on a weekly basis. Men often put in more hours at work than women do (Böheim et al., 2007). It is evident from the split into male, female, and mixed occupations that the selections are consistent with Austria's conventional gender-specific career choices (Leitner & Dibiasi, 2015).

The difference in pay between full-time and part-time female workers is mostly explained by the nature of work and personal traits, particularly human capital (Matteazzi et al., 2017). Men consistently hold higher-paying positions while women routinely work in lower-paying roles. This disparity may be due to actual hurdles to employment or to differences in gender preferences for various job types (Kunze, 2017). Women who work part-time are disproportionately concentrated in low-paying industries and occupations (Matteazzi et al., 2017). Böheim et al. (2007) in their analysis predict that earnings would decrease as the proportion of women employed increased.

Men experienced a salary penalty that was slightly less severe than women did, and there is no statistical proof that the wage penalty got worse with time. The inequalities for female workers are not statistically significant at conventional levels. Foreign nationals received lower earnings than Austrians.

Workers in the white-collar sector made more money than those in the blue-collar sector. In comparison to men, women who work full-time are also separated into low-

value sectors and professions (Matteazzi et al., 2017). Böheim et al. (2007) discovered in their research that married women earned less than single women did, also shown in other empirical studies, but that males benefited financially from marriage (Böheim et al., 2007).

Women are behind in terms of educational achievement and work market experience, according to Böheim et. al. (2019). The gender wage gap was lessened by smaller gender-specific differences in occupational segregation and in holding a position of leadership. Non-linear contracts disadvantage women in high-skilled professional employment, according to Goldin (2014). Men are more likely than women to work long hours shift and these hours are not same rewarded in some industries. (Goldin, 2014). Azmat and Ferrer (2016) conducted a study on the legal industry and discovered that women perform worse than men when it comes to billing hours and client revenue, which helps to explain a portion of the gender pay discrepancy. They demonstrate that women recruit fewer clients and bill fewer hours than men. They also discover that female lawyers have lower initial professional objectives, which is a significant success predictor (Azmat & Ferrer, 2016). While the male position remained stable or even declined in some areas, the female position in labor market negotiation procedures very substantially improved in the last years (Fritsch et al., 2019).

2.3 Factors that have the most impact on the wage in Austria

According to research findings for Austria, variations in years of education and real job experience account for a sizable portion of the overall gender wage disparity.

According to Becker (1964), because of family responsibilities, particularly in the early stages of their careers, women invest less in human capital than men because they anticipate participating in the labor market for fewer hours overall (when temporarily or permanently leaving the workforce or returning with fewer hours), which will result

in lower revenues and less income gain (Becker, 1964). According Böheim et al (2020) analysis between 2006 and 2017, disparities in the observable factors, such as educational attainment, experience, employment, or industry, have taken on a greater significance in explaining the gender wage disparity (Böheim et al., 2020).

The quantity of formal education a person has is likely the key factor in determining their wage. Women appear to only complete obligatory education at the lower end of the educational distribution described by Böheim et al. (2011), whereas men typically have completed an apprenticeship (Böheim et al., 2011). According to Böheim et al. (2019), both the uncorrected and corrected gender wage gaps have a negative correlation with the unemployment rate. The gender wage gap decreases as the unemployment rate rises (Böheim et al., 2019).

Women's comparatively lower salaries may be partially explained if they have lesser endowments of certain traits than men. The productivity characteristics that have received the most research, particularly education and years of job experience, frequently vary by gender (Kunze, 2017). The Mincerian human capital earnings function is the foundation upon which the majority of gender wage gap literature examines the relationship between earnings, education, and skill development (Kunze, 2017; Mincer, 1974).

Having children is another significant element that has a negative impact on women's performance (Azmat & Ferrer, 2016). Traditionally, males have worked steadily and full-time for their whole lives. The work landscape for women is far more variable both within and between countries, as well as through time. The gender wage gap raises the possibility that this could lead to inaccurate estimates of the gender salary difference that has been observed over time or between countries (Kunze, 2017). (Kunze, 2017).

The relationship between educational attainment and job experience is crucial for understanding differences in salaries, according to the human capital model (Becker

1964). It was common for women to work for free or solely for pay prior to marriage. Full-time occupations and part-time ones can differ significantly. Over the course of a year, part-time employment certainly yields less work experience than equivalent full-time employment. Part-time employment is therefore expected to have a detrimental impact on future career advancement in accordance with the human capital model (Kunze, 2015).

A human capital model framework has traditionally been used to analyze significant earnings losses caused by reduced working hours and parental leave. A woman should choose whether to return to work when to return, and whether to work full- or part-time after giving birth (Kunze, 2017). The observed convergence in male and female earnings over time has also been attributed to the relative growth in the human capital of women, with the relative increase in work experience having a greater impact than the proportionate rise in education (Blau and Kahn, 2016).

Studies that discover gender variations in entry-level pay point to the occupation (Fitzenberger & Kunze, 2005) and pre-labor market variables (Bertrand et al., 2010, Buffington et al., 2016) as significant predictors of entry-level pay inequalities. Additionally, the above-mentioned individual fixed factors at entry may result in significant variations in salary returns over the course of a career (Kunze, 2017). It is obvious that changes in the labor market around the time women have children have an impact on the gender wage gap.

Behind the gender wage gap, there is another situation where is "Family gap" existing. Women with children are paid less than women without children, according to a recurrent finding in international studies called the family gap (Davies & Pierre, 2005). Due to the relatively large returns to experience before becoming a mother, delaying childbirth results in relative improvements in pay (Miller, 2011). Angelov et al. (2016) discovers that from before conception to ten years after, the gender pay disparity among parent couples increased by ten percentage points. This can be explained by the fact that after having a kid, people tend to work less hours, which causes human

capital to depreciate over time (Kunze, 2017). The adoption of laws that assisted women in catching up to men may have been one explanation for the decrease in observed and unobserved traits (Böheim et al., 2019). The amendment to the equal treatment statute that required to disclose the wages they pay their employees may have offered greater direction for wage discussions.

Riley-Bowles et al. (2005) demonstrate that women typically negotiate more successfully when there is less ambiguity over pay. Additionally, it's possible that the 2010 modification to the child-care stipend or the 2007 expansion of childcare facilities enhanced women's commitment to the labor market (Riley-Bowles et al., 2005). Men and women still differ in fundamental ways where labor market experience, occupational and industry segregation, and labor market attachment lead to average salary differences (Böheim et al., 2019).

2.4 Influence of Covid – 19 Pandemic on the occupation and employment of Austrian citizens

The COVID-19 crisis has had a significant and far stronger impact on Austria's labor market than did the Great Recession of 2009 in terms of the rise in unemployment and decline in employment. The number of unemployed people rise by more than 200,000, to 534,000, after the first lockdown in March 2020 (Ragacs & Reiss, 2021).

During the COVID-19 mitigation phase, a sizable portion of the Austrian population sample experienced improvements in quality of life and perceived productivity. The quality of life was higher when working from home during the mitigation period, although this was unrelated to an increase in perceived productivity. Findings from Weitzer (2021) imply that increases in perceived productivity did not result in a link between working from home and a higher quality of life (Weitzer et. al., 2021).

Firms have worked to retain workers in sectors where labor shortages are a recurring issue to avoid them during the anticipated rebound in the economy. Working fewer hours was a very efficient way to stop the unemployment rate from rising even more (Ragacs & Reiss, 2021). Pichler et al. (2020) explained in their findings that many surveys kinds were undertaken at the start of the pandemic. Due to the exclusion of income components like tips and overtime pay in the computation of short-time work allowances, some workers, such as those in the tourist and catering industries, lost greater portions of their disposable income when sent into short-term work (Theurl 2020).

In 2020, unemployment rates increased for all educational levels, but the impact of redundancy was significantly less pronounced for those with higher degrees. Even though the number of unemployed people with no or little education increased at a rate similar to the national average and those employed with a high school diploma, started at a much higher unemployment rate (Ragacs & Reiss, 2021). Because they frequently derived their income from state handouts prior to the crisis, those with the lowest incomes were least affected by income losses connected to the crisis (Fink et al. 2020).

There are substantial regional differences in Austria in the significance of the negatively impacted hospitality and food service businesses. Prior to the crisis, Tyrol and Salzburg had the highest proportion of this industry in terms of both added value and total employment. Therefore, it is not surprising that Salzburg and Tyrol, the two provinces with the lowest unemployment rates in prior years in Austria, had a particularly large increase in unemployment. However, Vienna's industrial structure cannot account for the comparatively sharp increase in unemployment, as employment in the same sectors decreased more sharply than the national average (Ragacs & Reiss, 2021).

In Austria, mothers were not more severely impacted by the 2020 labor market crisis than fathers or childless women. Among working parents, moms experienced the same proportion of job losses or short-term employment as males or childless women (Steiber et. al., 2021). Even though some people seemed to gain from the measures put in place, it appears that the initial period of relaxation had a detrimental influence on the lives of the Austrian population. Decreases in quality of life and perceived productivity were recorded more frequently (Weitzer et. al., 2021).

The young Austrian individuals' mental health burden during the mitigation period was frighteningly high, according to Pieh et al. (2020), who suggested that this might be explained by their greater occupational uncertainty and greater daily limitations (Weitzer et. al., 2021). Employees with tertiary education were substantially less affected by the rise in unemployment than younger workers, particularly immigrants, who were also relatively more affected (Ragacs & Reiss, 2021). Since middle-aged and older persons were noticeably more likely than younger participants to indicate no change, the mitigation measures appear to have had a greater positive and negative impact on younger Austrians' quality of life than on other age groups (Weitzer et. al., 2021).

According to Pieh et al. (2020), the mitigation phase had a more detrimental effect on women's mental health in Austria (Pieh et al., 2020). Men's marital status or being in a partnership seemed to be associated with an improvement in quality of life, while for women, the opposite impact was seen, married or in partnership women were less likely than single women to report an improvement in quality of life (Weitzer et al., 2021).

Although it was slowing down in 2020, the labor supply was still expanding compared to where it had been during the Great Recession (Ragacs & Reiss, 2021). The labor market steadily improved as lockdown measures were relaxed until November, when a second lockdown, followed by a third in early 2021, put the market under severe strain once more (Ragacs & Reiss, 2021).

3 Implementation and methodology

3.1 Data

For the empirical analysis of this study obtaining the relevant data is crucial.

Data, that will be used for analyzing the above-mentioned questions, has been obtained from the Statistic Austria EU-SILC database. The dataset for the period 2015-2020 has information about wage per person differentiating between female/male, age, occupation, education, length of service in the enterprise, full- and part-time work, Saturday and Sunday work, shift work, type of employment contract, region, or size of the enterprise, etc.

3.2 Methodology

For presenting the gender wage gap over five years (from 2015 until 2020) a linear regression model is used. Initially, it has defined dependent and independent variables. In this model, the wage amount is used as the dependent variable, and the independent variables that are used are presented in part 3.3 of the master thesis, written as summary statistics for the explanatory variables for 2015 and 2020 below.

All these values are used as the independent variables in a linear regression model to analyze their influence on the gender wage gap in Austria. The linear regression analysis is conducted in R Studio.

To show the gender wage gap over the five years (2015-2020), is calculated the average individual salary of females per hour and compare with the average individual male's salary per hour splitted into different types of occupations, e.g., finance, banking, art, medicine, agriculture and all other which are presented later in the NACE Rev 2 table.

Additionally, it showed the share of females and males per occupation type in percentage per year and observed how it has developed during the time from 2015-2020 concentrating on the pandemic year. The aim here is to analyze whether the change

in working environment and behavior, which all of us experienced changing from office-based to home office working space, impact the change of occupations.

3.3 Summary statistics for the explanatory variables

Sex

Males and Females employed in Austria during 2015-2020.

Men and women specialize in different fields and spend different amounts of time networking and working on a weekly basis. Men often put in more hours at work than women do (Böheim et al., 2007). It is evident from the split into male, female, and mixed occupations that the selections are consistent with Austria's conventional gender-specific career choices (Leitner & Dibiasi, 2015).

Age

Males and Females from 18 to 65 years old.

The young Austrian individuals' mental health burden during the mitigation period was frighteningly high, according to Pieh et al. (2020), who suggested that this might be explained by their greater occupational uncertainty and greater daily limitations (Weitzer et. al., 2021). Employees with tertiary education were substantially less affected by the rise in unemployment than younger workers, particularly immigrants, who were also relatively more affected (Ragacs & Reiss, 2021). Since middle-aged and older persons were noticeably more likely than younger participants to indicate no change, the mitigation measures appear to have had a greater positive and negative impact on younger Austrians' quality of life than on other age groups (Weitzer et. al., 2021).

Work Experience

Work experience explanation is based on the beginning of the first regular job. Frequently: a job that lasts at least six months. Short-term job gaps can be disregarded. Include the period the person was on maternity leave or completed an apprenticeship.

The time spent on maternity leave or performing community and military service is not counted!

Item Number P006000 - These years also count as years of employment for responders who were employed but did not register. Life's realities are at issue, not their legal standing.

Any years that were spent working for pay are included. If the person identifies himself as primarily employed during this time, the years are included even if the degree of employment was low, such as marginally employed or simply casual work.

Retirement-age individuals should only have their working hours taken into consideration if they still identify as employed when asked about their current primary employment. The number of years employed is calculated till retirement if "Retiree".

It is incorrect to immediately assume that the number of working years is equal to the age gap between when one started their first employment and when they are now. Women are more likely to have interruptions due to caring duties and maternity leave.

The relationship between educational attainment and job experience is crucial for understanding differences in salaries, according to the human capital model (Becker 1964). It was common for women to work for free or solely for pay prior to marriage. Full-time occupations and part-time ones can differ significantly. Over the course of a year, part-time employment certainly yields less work experience than equivalent full-time employment. Part-time employment is therefore expected to have a detrimental impact on future career advancement in accordance with the human capital model (Kunze, 2015).

According to Böheim et al. (2007) the gender wage gap has significantly decreased over the past two decades due to changes over the last two decades, including women's increased labor market participation, relative increases in formal and workplace-specific qualifications, and their penetration into top jobs. Political pressure for equal opportunities has also contributed to these changes (Böheim et al. 2007). Over time, women have accumulated far more experience in the labor market and have become

more comparable to males in this regard (Böheim et. al., 2019). By 2017, however, women were no longer eligible for educational bonuses and were instead paid less, which contributed to a wage difference that was 1.19 log points worse (Böheim et. al., 2019).

Education

The following four groups are created to explain the degree of education of employed persons in Austria (taking all 14 available categories in consideration):

- ***Educuation_Teaching***
- ***Education_Technical/Trade School***
- ***Education_Matura***
- ***Education_University***
- ***Education_other_after_Matura***

Group are based on the following 14 categories:

1. Hauptschule, Neue Mittel Schule, AHS (Gymnasium) lower level, other compulsory schools
2. Polytechnic School
3. Apprenticeship (vocational school)
4. Technical or commercial school (vocational middle school)
5. Health and Nursing School (Diploma Nursing)
6. Master Craftsman school
- 7th 5th - 8th grade of a general secondary school (Gymnasium upper level)
8. 1st - 3rd grade of a vocational college (HTL, HAK, HBLA, etc.)
9. 4th or 5th grade at a vocational college
10. Advanced course, college (HTL, HAK, HBLA, etc.), academy, courses at universities or technical colleges
11. Bachelor's degree at a university, technical college, or teacher training college
12. Master's or diploma studies at a university, technical college, or teacher training college

13. Postgraduate course (e.g. MBA, MSc)

14. Doctoral studies (Dr., PhD)

Records exist for degrees earned at ordinary schools or universities.

Additional professional training (such as certification as a fitness instructor), internal training, or formal exams (such as a civil service diploma).

Not the most recent level of schooling, but the highest level, is awarded. When students drop out of school early, the degree of education they accomplished is stated. Even though the qualification is not recognized in Austria, the level of education attained in the relevant country is applicable when training has been completed overseas. If no formal education has ever been received, the designation "compulsory school" is made.

A school that is required to attend, such as Hauptschule, AHS lower level, special school, and polytechnic school; formerly known as a public school, 8-year elementary school, and upper-level elementary school.

"Compulsory school" is mentioned even if it has not yet been completed.

Apprenticeship and technical training: Other titles include the journeyman's exam for the last apprenticeship and the skilled worker exam for forestry and agriculture.

Vocational schools (BMS or technical/commercial schools); prepare for employment and do not lead to the Matura (for example, home economics school for two years, hotel management school for three years). Also referred to as "educational institutions" up until the mid-1980s (for example, for kindergarten instructors).

Abitur, the matriculation test, and external Matura are other names for Matura.

Degrees with an academic title (Bakk, M.A., Mag, Dr. Dip-Ing, MBA, MAS, or equivalent) from a university or (technical) college. comparable diplomas from private universities and art institutions are also acceptable.

Other degrees available following graduation include those from academies (such as PDAK or SOZAK), BHS colleges or high school diploma programs, and university programs leading to academies-accredited degrees.

A degree is not the same as a prerequisite for admission to a university.

The higher formal educational qualification is listed here; however, it is not the last. Formal educational credentials are training programs that are organized legally, are supervised by authorities, and result in state-recognized credentials.

Women are behind in terms of educational achievement and work market experience, according to Böheim et. al. (2019). The gender wage gap was lessened by smaller gender-specific differences in occupational segregation and in holding a position of leadership. Non-linear contracts disadvantage women in high-skilled professional employment, according to Goldin (2014).

The quantity of formal education a person has is likely the key factor in determining their wage. Women appear to only complete obligatory education at the lower end of the educational distribution described by Böheim et al. (2011), whereas men typically have completed an apprenticeship (Böheim et al., 2011). According to Böheim et al. (2019), both the uncorrected and corrected gender wage gaps have a negative correlation with the unemployment rate. The gender wage gap decreases as the unemployment rate rises (Böheim et al., 2019).

In 2020, unemployment rates increased for all educational levels, but the impact of redundancy was significantly less pronounced for those with higher degrees. Even though the number of unemployed people with no or little education increased at a rate as the national average and those employed with a high school diploma, started at a much higher unemployment rate (Ragacs & Reiss, 2021). Because they frequently derived their income from state handouts prior to the crisis, those with the lowest incomes were least affected by income losses connected to the crisis (Fink et al. 2020).

Employment place of work

Classification is based on the place of work, not the place of living in Austria because some people are living in Burgenland for example and working in Vienna and vice versa.

Males and females living or coming from Austria but working abroad (in another state) are not taken into consideration.

There are substantial regional differences in Austria in the significance of the negatively impacted hospitality and food service businesses. Prior to the crisis, Tyrol and Salzburg had the highest proportion of this industry in terms of both added value and total employment. Therefore, it is not surprising that Salzburg and Tyrol, the two provinces with the lowest unemployment rates in prior years in Austria, had a particularly large increase in unemployment. However, Vienna's industrial structure cannot account for the comparatively sharp increase in unemployment, as employment in the same sectors decreased more sharply than the national average (Ragacs & Reiss, 2021).

Right to return to work after parental leave (Yes / No)

This variable is explaining a right to return to a job from their previous employer. Respondents answered yes or no, based on the situation.

A human capital model framework has traditionally been used to analyze significant earnings losses caused by reduced working hours and parental leave. A woman should choose whether to return to work when to return, and whether to work full- or part-time after giving birth (Kunze, 2017). The observed convergence in male and female earnings over time has also been attributed to the relative growth in the human capital of women, with the relative increase in work experience having a greater impact than the proportionate rise in education (Blau and Kahn, 2016).

Last professional function

The last professional function is variable which is representing categories that best describe the most recent job role of the respondent.

Information about several self-employment options:

Business enterprise: In Austria, most self-employed operations are governed by trade laws and call for the acquisition of a trade license. Unless expressly excluded or banned by law, all commercial operations fall under the scope of applicability of the trade regulations. For instance, mining, forestry, and agriculture are expressly excluded. Additionally excluded from the scope of application of the trade regulations are self-employed professions that are subject to other legal requirements (such as those of a notary, doctor, or pharmacist).

A general contrast is drawn between "free trades" (such as trade) and "regulated trades" (such as crafts and hospitality) in the context of commercial employment. A trade license (previously: trade license) is necessary for both kinds of trade; moreover, a certificate of qualification is needed for regulated trades. This evidence demonstrates that the applicant possesses the technical and business knowledge, abilities, and experience necessary to engage in the relevant trade. A managing director under commercial law with a certificate of qualification must be appointed if a sole owner does not offer one themselves.

Freelancing: Professional groupings that are exempt from trade restrictions and have their own statutory interest groups are known as the freelancing professions. Most often, to be able to perform these activities autonomously, one needs to have a college degree and a few years of professional experience. A freelancer's work must be done personally, with specialized knowledge and abilities, autonomously, and independently. Doctors, dentists, engineers, tax consultants, accountants, notaries, consulting business economists, architects, health experts, journalists, or painters are examples of typical "freelancers".

Less personal dependency (no commitment to working hours, directions, etc.) and the use of one's own work equipment are the main contrasts between a freelancing contract and a "real" job. Contrary to a contract for work, an employment relationship

terminates when the "work" is over; instead, it either needs a termination action (such as termination) or does so when the predetermined contract duration expires. Under a freelancing contract, it is necessary to pay social security taxes and income taxes (but not salary taxes).

Contractor: A person who engages in activity that is not covered by trade restrictions or that is unrelated to the field of endeavor of independent contractors. Contractors agree to complete a specified task on behalf of another person (the work ordered). You perform an operational activity within the parameters of a work contract for which you lack a trade license. When, where, and how the contractor works are not specified in a work contract. In contrast to a freelance agreement, he or she works alone.

Last employment relationship (permanent/temporary)

Last employment relationship, whether it was a limited or permanent last job connection.

An activity is considered temporary if both the employer and the employee agree that it will terminate at a specific time. This could either be a particular day or the fulfillment of an order.

Replacements for maternity leaves frequently have fixed-term agreements. Fixed-term employment contracts are typical for seasonal employees and those who work for a temporary employment agency.

There is always a fixed-term job connection with an apprentice.

Contracts that are first established for a specific amount of time but are later automatically extended (extended probationary period) are not regarded as fixed-term agreements. It is a fixed-term employment connection if the contract expires, and a new contract needs to be drafted.

Women with children are paid less than women without children, according to a recurrent finding in international studies called the family gap (Davies & Pierre, 2005). Due to the relatively large returns to experience before becoming a mother, delaying childbirth results in relative improvements in pay (Miller, 2011). Angelov et al. (2016) discovers that from before conception to ten years after, the gender pay disparity among parent couples increased by ten percentage points. This can be explained by the fact that after having a kid, people tend to work less hours, which causes human capital to depreciate over time (Kunze, 2017).

The difference in pay between full-time and part-time female workers is mostly explained by the nature of work and personal traits, particularly human capital (Matteazzi et al., 2017). Men consistently hold higher-paying positions while women routinely work in lower-paying roles. This disparity may be due to actual hurdles to employment or to differences in gender preferences for various job types (Kunze, 2017). Women who work part-time are disproportionately concentrated in low-paying industries and occupations (Matteazzi et al., 2017). Böheim et al. (2007) in their analysis predict that earnings would decrease as the proportion of women employed increased.

Men experienced a salary penalty that was slightly less severe than women did, and there is no statistical proof that the wage penalty got worse with time. The inequalities for female workers are not statistically significant at conventional levels. Foreign nationals received lower earnings than Austrians.

Workers in the white-collar sector made more money than those in the blue-collar sector. In comparison to men, women who work full-time are also separated into low-value sectors and professions (Matteazzi et al., 2017). Böheim et al. (2007) discovered in their research that married women earned less than single women did, also shown in other empirical studies, but that males benefited financially from marriage (Böheim et al., 2007).

Employer formerly self-employed (Yes/No)

A self-employed individual doesn't have a set employer who gives them a steady salary or paycheck. Instead, they work for themselves. Independent contractors, sometimes known as self-employed people, are paid by directly contracting with a trade or business.

Number of employees in last place of work

The term "place of employment" refers to the site or set of buildings where a person typically works or from whence, they begin work at other locations.

People who worked for the same business and frequently went to the same workplace should be included in the count.

More than one job

It refers to a supplemental job as an employee, a freelancer, or an assistant.

Change of job in the last 12 months or since the last interview P034000

When it comes to employees, this can mean a change of employers, a new employment contract with the same employer and a new area of duty, or the company being acquired by a new owner, even though the employee's area of responsibility has not changed.

NOT intended: shifting your area of duty without signing a new contract with your employer or signing a new contract without changing your area of responsibility.

For those who work for themselves, this entails: a shift in the type of activity(s) conducted, a switch from independent work to dependent work, and vice versa.

NOT intended: ending or entering new contracts or working for various clients while continuing to execute the same kind of job(s).

Restrictions of the Sample

Respondents between 20 and 65 years old are used in the sample. All respondents younger than 20 and older than 65 years old were excluded from the sample. All respondents who were not answering the question relevant to one taken variable are also excluded. Respondents who are not working or searching for jobs are also excluded. The method of a randomly selected sample size is not used. All the available groups of variables are used that are relevant to my topic. These are p_silc2015_dat representing the data from 2015 and p_silc2020_dat representing the data from 2020. Variables from group P are already listed in the master's thesis (in the third part of the thesis).

4 Empirical Results

4.1 Model 1: Cross-Sectional Regression

A regression model is estimated to try to explain individual Gross hourly wages in Austria. To explain whether gender, age, citizenship, work experience, part-time and full-time employment, self-employed on a part-time and full-time basis, occupation, type of contract, education, health status, and place of work in Austria affects the gross hourly wage, the following table shows the results of the multiple regression model.

4.1.1. Estimation of multiple regression parameters in 2015

The dependent variable in the model is gross hourly wage (GHW).

Netto gross hourly wage (GHW) is calculated by dividing the usual monthly earnings by the number of working weeks in a year (47 working weeks for one year in Austria).

The independent variables used in the analysis are:

Sex, age, citizenship, work experience, part-time employment, full-time and part-time employment, full-time and part-time self-employed, occupation, type of contract, education, health status, and place of work in Austria.

The analysis used secondary data, taken from <https://www.statistik.at/>.

Table 1: Yearly comparison of hourly wage, hours worked, and observations for men and women

	Year	
	2015	2020
Men		
Hourly Wage	18.8	22.1
Hours worked	42.5	41.7
Observations	1517	1462
Women		
Hourly Wage	15.7	19.8
Hours worked	32.7	32.9
Observations	1413	1433

The following graph shows the histogram of GHW-Gross hourly wage in 2015 for males and females.

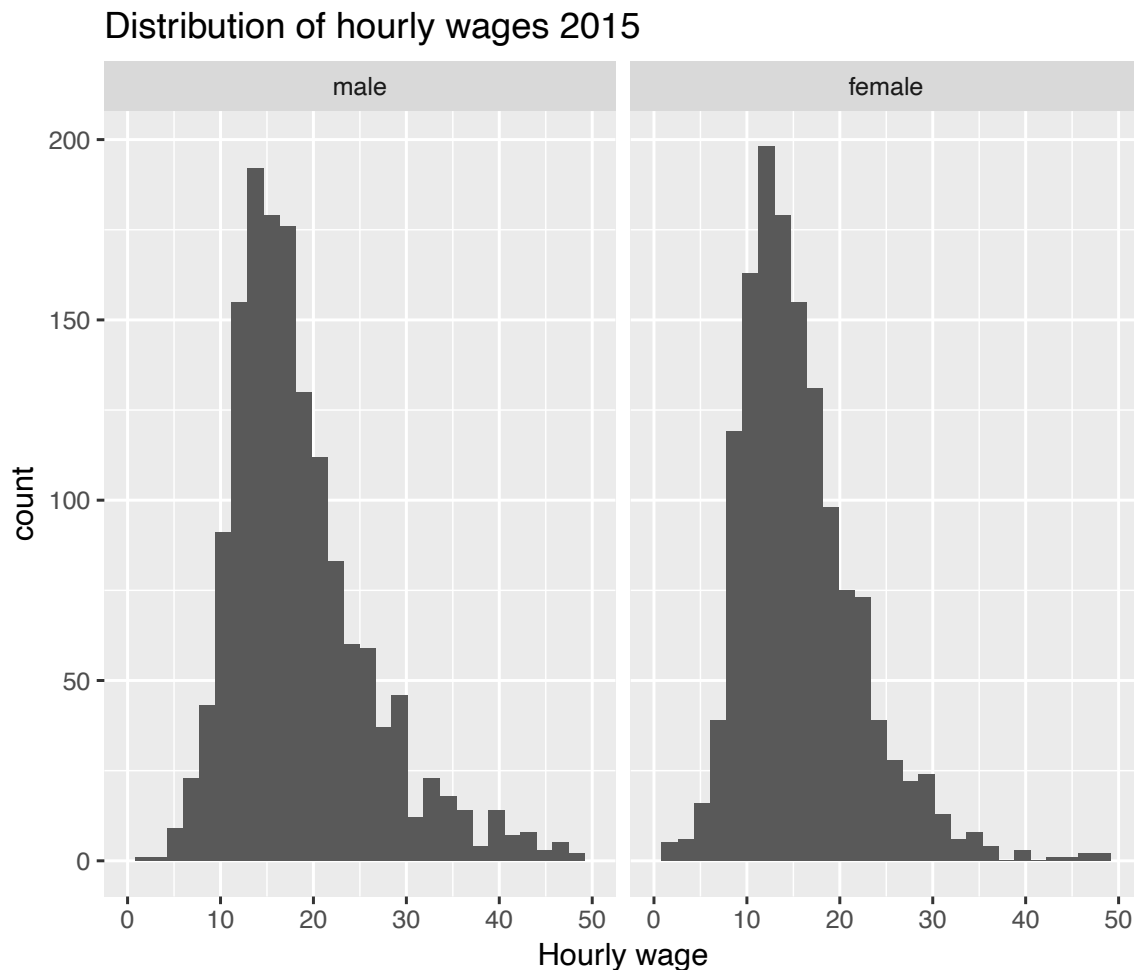


Figure 3: Histogram of the distribution of gross hourly wage for 2015

According to the graph above, it can be said that the variable gross hourly wage significantly deviates from the normal distribution. Therefore, it is necessary to transform the dependent variable using a logarithmic transformation.

According to Figure 3 of logarithmic values, it is evident that in the following it will be necessary to specify a log-linear model.

The following table shows the estimated parameters of the log-linear regression model in 2015.

Table 2: Log-linear Regression model for an hourly wage in 2015

Table 1: Raw and corrected gender wage gap in Austria 2015		
Variable	Model 1	Model 2
Sex (Female)	−0.171*** (0.016)	−0.088*** (0.022)
Renouncement to Citizenship		−0.137*** (0.030)
Work Experience (Linear)		5.248*** (0.437)
Work Experience (Quadratic)		−1.397*** (0.392)
Employed Part-Time		−0.079*** (0.019)
Self-Employed Full-Time		−0.230 (0.172)
Student		0.292 (0.222)
Temporary Contract		−0.106*** (0.034)
In a Relationship		0.124*** (0.046)
High School Diploma		0.329*** (0.016)
Position of Leadership		0.171*** (0.028)
Good Health Status		−0.041** (0.016)
Average Health Status		−0.097*** (0.022)
Poor Health Status		−0.126** (0.052)
Very Poor Health Status		−0.240* (0.136)
State - Carinthia		−0.0001 (0.052)
State - Lower Austria		0.004 (0.047)
State - Upper Austria		0.078* (0.047)
State - Salzburg		0.043 (0.053)
State - Styria		0.020 (0.048)
State - Tyrol		−0.034 (0.051)
State - Vorarlberg		0.072 (0.056)
State - Vienna		0.095** (0.046)
Sex (Female) × In a Relationship		−0.062** (0.029)
Constant	3.018*** (0.025)	2.751*** (0.057)
Observations	2,930	2,930
R ²	0.038	0.251
Adjusted R ²	0.038	0.245
Residual Std. Error	0.432 (df = 2928)	0.383 (df = 2905)
F Statistic	115.157*** (df = 1; 2928)	40.515*** (df = 24; 2905)
Note: *p<0.1; **p<0.05; ***p<0.01		

*It should be noted that a significant b-weight implies a significant semi-partial correlation. Unstandardized regression weights are represented by b. The semi-partial correlation squared, or sr2, is represented. The lower and upper boundaries of a confidence interval are denoted, respectively, by LL and UL. P .05. ** P .01. * Indicates p .05.*

Based on the results in the table above, we conclude that women would have earned on average about 17,10 log points less than men in 2015.

The model shows that the education (High School Diploma) received a gross hourly wage (GHW) in 2015 of 32,90 log points more in comparison to other respondents like the education (Technical / Trade School).

A closer look at the explanatory variable working part-time reveals that, for example, respondents who worked part-time received a gross hourly wage in 2015 of 7,90 log points less in comparison to other respondents who worked on a full-time basis that were not self-employed. On the other side, working full-time as a self-employed revealed that, respondents who worked on a full-time basis in their own company received a gross hourly wage in 2015 of 23,00 log points less than respondents that were working on a part-time basis as self-employed.

Work experience is the next variable that are explaining the gender wage gap in this sample. Work experience (linear) shows that respondents with one year of experience received a gross hourly wage in 2015 of 52,48 log points more than respondents with less work experience. Work experience (quadratic) shows that respondents with years of experience received a gross hourly wage in 2015 of 13,57 log points less than respondents with less work experience.

Respondents that have position of leadership in 2015 received a gross hourly wage (GWH) of 17,10 log points more, than other respondents that are not working in the leadership positions.

The model shows that the internship/praxis position workers (Students) received a gross hourly wage (GHW) in 2015 of 29,20 log points more in comparison to other respondents working in other positions.

Analyzing the type of contract can be concluded that respondents that worked with temporary contracts received a gross hourly wage in 2015 of 10,60 log points less in comparison to other respondents who worked with permanent contract types.

Renouncement to citizenship shows that the respondents without Austrian citizenship, that worked in Austria received a gross hourly wage (GHW) in 2015 of 13,70 log points less in comparison to other respondents that are having Austrian citizenship and worked in Austria.

Marital status is the next variable that impacts the model. The model shows that the married respondents in 2015 received a gross hourly wage (GHW) of 12,40 log points more, than respondents that are married but living separately and not married respondents.

Analyzing the health status can be concluded that respondents that worked with good health status received a gross hourly wage in 2015 of 4,10 log points less in comparison to other respondents who worked with better health status. Respondents who worked with average health status in 2015 received a gross hourly wage of 9,70 log points less than respondents that had good health status. Respondents who worked with poor health status in 2015 received a gross hourly wage of 12,60 log points less than respondents that had very poor health status. Respondents with very poor health status in 2015 received a gross hourly wage of 2,4 log points less than respondents in other health categories.

States are the last variables that impact the analyzed model. The model shows that respondents that are working in Carinthia received a gross hourly wage in 2015 of 0,4 log points more than respondents working in Lower Austria. Respondents that are working in Lower Austria received a gross hourly wage in 2015 of 7,8 log points more than respondents working in Upper Austria. Respondents that are working in Upper Austria received a gross hourly wage in 2015 of 4,3 log points more than respondents working in Salzburg. Respondents that are working in Salzburg received a gross hourly wage in 2015 of 2,00 log points more than respondents working in Styria. Respondents that are working in Styria received a gross hourly wage in 2015 of 2,2 log points more than respondents working in Tyrol. Respondents that are working in Tyrol received a gross hourly wage in 2015 of 3,4 log points less than respondents working in

Vorarlberg. Finally, respondents that are working in Vienna received a gross hourly wage in 2015 of 9,5 log points more than respondents working in all other states in Austria.

4.1.2. Estimation of multiple regression parameters in 2020

In this part are presented the results of the regression analysis in 2020. The model will include the same variables as in the previous regression model in 2015.

The dependent variable in the model is gross hourly wage (GHW).

Netto gross hourly wage (GHW) is calculated by dividing the usual monthly earnings by the number of working weeks in a year (47 working weeks for one year in Austria).

The independent variables used in the analysis are:

Sex, age, citizenship, work experience, part-time and full-time employment, part-time and full-time self-employed, occupation, type of contract, education, health status, and place of work in Austria.

The analysis used secondary data, taken from <https://www.statistik.at/>.

Table 3: Yearly comparison of hourly wage, hours worked, and observations for men and women

	Year	
	2015	2020
Men		
Hourly Wage	18.8	22.1
Hours worked	42.5	41.7
Observations	1517	1462
Women		
Hourly Wage	15.7	19.8
Hours worked	32.7	32.9
Observations	1413	1433

The following graph shows the histogram of GHW – Gross hourly wage as a dependent variable.

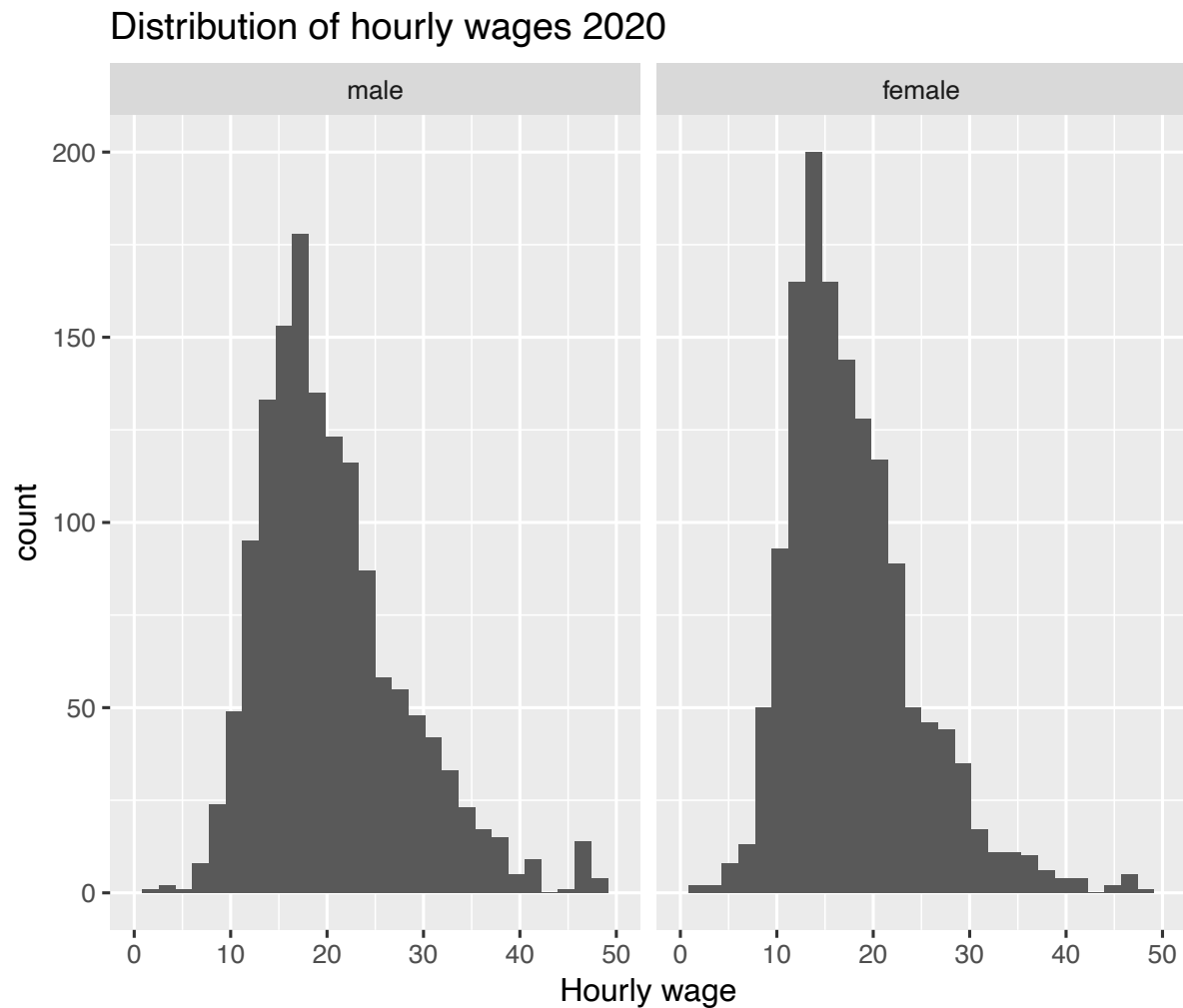


Figure 4: Histogram of distribution of the Gross hourly wage for 2020

According to the graph above, it can be concluded that the variable GHW significantly deviates from the normal distribution. Therefore, it is necessary to transform the dependent variable using a logarithmic transformation.

According to Figure 5. of logarithmic values, it is evident that in the following it will be necessary to specify a log-linear model for year 2020.

The following table shows the estimated parameters of the modified log-linear regression model in 2020.

Table 4: Log-linear Regression model for an hourly wage in 2020

Table 2: Raw and corrected gender wage gap in Austria 2020		
Variable	Coefficient (SE) - Model 1	Coefficient (SE) - Model 2
Sex (Female)	−0.153*** (0.016)	−0.092*** (0.021)
Renouncement to Citizenship		−0.130*** (0.031)
Work Experience (Linear)		5.677*** (0.416)
Work Experience (Quadratic)		−0.847** (0.380)
Employed Part-Time		−0.032* (0.018)
Self-Employed Full-Time		−0.584*** (0.131)
Self-Employed Part-Time		−0.156 (0.185)
Student		−0.201 (0.166)
Temporary Contract		0.078** (0.032)
In a Relationship		0.147*** (0.044)
High School Diploma		0.329*** (0.015)
Position of Leadership		0.220*** (0.026)
Good Health Status		−0.032** (0.015)
Average Health Status		−0.097*** (0.022)
Poor Health Status		−0.232*** (0.056)
Very Poor Health Status		−0.214 (0.151)
State - Carinthia		0.043 (0.049)
State - Lower Austria		0.072 (0.045)
State - Upper Austria		0.109** (0.045)
State - Salzburg		0.077 (0.050)
State - Styria		0.065 (0.045)
State - Tyrol		0.071 (0.049)
State - Vorarlberg		0.165*** (0.053)
State - Vienna		0.153*** (0.044)
Sex (female) × In a Relationship		−0.085*** (0.028)
Constant	3.137*** (0.025)	2.735*** (0.062)
Observations	2,895	2,895
R ²	0.032	0.272
Adjusted R ²	0.031	0.266
Residual Std. Error	0.423 (df = 2893)	0.368 (df = 2869)
F Statistic	95.065*** (df = 1; 2893)	42.878*** (df = 25; 2869)

Note: *p<0.1; **p<0.05; ***p<0.01

It should be noted that a significant *b*-weight implies a significant semi-partial correlation. Unstandardized regression weights are represented by *b*. The semi-partial correlation squared, or *sr*², is represented. The lower and upper boundaries of a confidence interval are denoted, respectively, by *LL* and *UL*. *P*.05. ***P*.01. * Indicates *p*.05.

Based on the results in the table above, we conclude that women would have earned on average about 15,30 log points less than men in 2020.

The model shows that the education (High School Diploma) received a gross hourly wage (GHW) in 2020 of 32,90 log points more in comparison to other respondents like the education (Technical / Trade School).

A closer look at the explanatory variable working part-time reveals that, for example, respondents who worked part-time received a gross hourly wage in 2020 of 3,20 log points less in comparison to other respondents who worked on a full-time basis that were not self-employed. On the other side, working full-time as a self-employed revealed that, respondents who worked on a full-time basis in their own company received a gross hourly wage in 2020 of 58,40 log points less than respondents that were working on a part-time basis as self-employed.

Work experience is the next variable that are explaining the gender wage gap in this sample. Work experience (linear) shows that respondents with one year of experience received a gross hourly wage in 2020 of 56,77 log points more than respondents with less work experience. Work experience (quadratic) shows that respondents with years of experience received a gross hourly wage in 2020 of 8,47 log points less than respondents with less work experience.

Respondents that had a position of leadership in 2020 received a gross hourly wage (GWH) of 22,00 log points more, than other respondents that are not working in leadership positions.

The model shows that the internship/praxis position workers (Students) received a gross hourly wage (GHW) in 2020 of 2,10 log points less in comparison to other respondents working in other positions.

Analyzing the type of contract can be concluded that respondents that worked with temporary contracts received a gross hourly wage in 2020 of 7,80 log points more in comparison to other respondents who worked with permanent contract types.

Renouncement to citizenship shows that the respondents without Austrian citizenship, that worked in Austria received a gross hourly wage (GHW) in 2020 of 1,30 log points less in comparison to other respondents that are having Austrian citizenship and worked in Austria.

Marital status is the next variable that impacts the model. The model shows that the married respondents in 2020 received a gross hourly wage (GHW) of 1,47 log points more, than respondents that are married but living separately and not married respondents.

Analyzing the health status can be concluded that respondents that worked with good health status received a gross hourly wage in 2020 of 3,20 log points less in comparison to other respondents who worked with better health status. Respondents who worked with average health status in 2020 received a gross hourly wage of 9,70 log points less than respondents that had good health status. Respondents who worked with poor health status in 2020 received a gross hourly wage of 23,20 log points less than respondents that had very poor health status. Respondents with very poor health status in 2020 received a gross hourly wage of 21,40 log points less than respondents in other health categories.

States are the last variables that impact the analyzed model. The model shows that respondents that are working in Carinthia received a gross hourly wage in 2020 of 0,4 log points more than respondents working in Lower Austria. Respondents that are working in Lower Austria received a gross hourly wage in 2020 of 7,2 log points more than respondents working in Upper Austria. Respondents that are working in Upper Austria received a gross hourly wage in 2020 of 10,9 log points more than respondents working in Salzburg. Respondents that are working in Salzburg received a gross hourly wage in 2020 of 7,70 log points more than respondents working in Styria. Respondents that are working in Styria received a gross hourly wage in 2020 of 6,5 log points more than respondents working in Tyrol. Respondents that are working in Tyrol received a gross hourly wage in 2020 of 7,1 log points more than respondents working

in Vorarlberg. Finally, respondents that are working in Vienna received a gross hourly wage in 2020 of 15,3 log points more than respondents working in all other states in Austria.

4.2 Model 2: The changes in shares of women and men separately in different fields of employment

In this part of the paper, the results of the research are presented with the aim of determining changes in the percentage representation of women in a particular industry (certain branches of the economy) in 2015 and 2020.

Determining the representation of women in certain branches of the economy

Table 5: Determination of the women in certain branches of the economy

ID	Industry of the last company (formerly employed)	2015		2020		Differences (2020-2015)	
		f	%	f	%	f	%
1	Farming, Hunting	51	3,79	24	1,00	-27	-2,79
2	Forestry and logging	7	0,52	0	0,00	-7	-0,52
3	Fisheries and aquaculture	7	0,52	0	0,00	-7	-0,52
4	Coal mining	0	0,00	1	0,04	1	0,04
5	Extraction of oil and natural gas	0	0,00	0	0,00	0	0,00
6	Ore mining	0	0,00	1	0,04	1	0,04
7	Quarrying of stone and earth, other mining	1	0,07	0	0,00	-1	-0,07
8	Provision of services for mining and for the extraction of rock and earth	1	0,07	1	0,04	0	-0,03
9	Production of food and fodder	0	0,00	0	0,00	0	0,00
10	Beverage production	20	1,49	7	0,29	-13	-1,19
11	Tobacco processing	2	0,15	1	0,04	-1	-0,11

12	Manufacture of textiles	0	0,00	0	0,00	0	0,00
13	Manufacture of clothing	6	0,45	3	0,13	-3	-0,32
14	Manufacture of leather, leather goods and shoes	14	1,04	7	0,29	-7	-0,75
15	Manufacture of wood, wicker, cork, and wicker products	6	0,45	0	0,00	-6	-0,45
16	Manufacture of paper, cardboard, and articles mad of it	2	0,15	2	0,08	0	-0,07
17	Manufacture of printed matter, duplication of recorded sound, image, and data carriers	3	0,22	5	0,21	2	-0,01
18	Coking plant and petroleum processing	0	0,00	1	0,04	1	0,04
19	Manufacture of chemical products	4	0,30	2	0,08	-2	-0,21
20	Manufacture of pharmaceutical products	2	0,15	0	0,00	-2	-0,15
21	Manufacture of rubber and plastic products	6	0,45	2	0,08	-4	-0,36
22	Manufacture of glass	7	0,52	2	0,08	-5	-0,44
23	Ceramics, processing of stone and earth metal production and processing	3	0,22	5	0,21	2	-0,01
24	Manufacture of metal products	13	0,97	6	0,25	-7	-0,72
25	Manufacture of data processing equipment, electronic and optical products	15	1,11	9	0,38	-6	-0,74
26	Manufacture of electrical equipment	5	0,37	3	0,13	-2	-0,25
27	Mechanical engineering	11	0,82	5	0,21	-6	-0,61
28	Manufacture of motor vehicles and motor vehicle parts	7	0,52	6	0,25	-1	-0,27

29	Other Vehicle construction	7	0,52	4	0,17	-3	-0,35
30	Manufacture of furniture	3	0,22	1	0,04	-2	-0,18
31	Manufacture of other goods	6	0,45	4	0,17	-2	-0,28
32	Repair and installation of machinery and equipment	10	0,74	1	0,04	-9	-0,70
33	Power supply	3	0,22	3	0,13	0	-0,10
34	Water supply	9	0,67	2	0,08	-7	-0,59
35	Sanitation	0	0,00	0	0,00	0	0,00
36	Collection, treatment and disposal of bottling, recovery	0	0,00	0	0,00	0	0,00
37	Clean-up of environmental pollution and other waste disposal	3	0,22	1	0,04	-2	-0,18
38	Building construction	0	0,00	1	0,04	1	0,04
39	Civil engineering	16	1,19	9	0,38	-7	-0,81
40	Preparation site work, bulging installation and other finishing trades	7	0,52	6	0,25	-1	-0,27
41	Trades in motor vehicles	29	2,15	19	0,79	-10	-1,36
42	Wholesaling (excluding trade in motor vehicles)	14	1,04	6	0,25	-8	-0,79
43	Retail trade (excluding motor vehicle trade)	30	2,23	24	1,00	-6	-1,23
44	Land transport and pipeline transport	82	6,09	46	1,92	-36	-4,17
45	Shipping	23	1,71	14	0,58	-9	-1,12
46	Aviation	0	0,00	2	0,08	2	0,08
47	Warehousing and provision of other transport services	23	1,71	8	0,33	-15	-1,38
48	Postal, courier and express services	14	1,04	9	0,38	-5	-0,66
49	Lodging	24	1,78	13	0,54	-11	-1,24
50	Gastronomy	36	2,67	16	0,67	-20	-2,01

51	Publishing	5	0,37	1	0,04	-4	-0,33
52	Production, rental and distribution of films and television programs; cinemas; recording studios	0	0,00	2	0,08	2	0,08
53	Broadcasters	0	0,00	0	0,00	0	0,00
54	Telecommunications	3	0,22	1	0,04	-2	-0,18
55	Provision of information's technology services	1	0,07	1	0,04	0	-0,03
56	Information services	1	0,07	2	0,08	1	0,01
57	Provision of financial services	17	1,26	10	0,42	-7	-0,85
58	Insurance companies, reinsurance companies and pensions funds (excluding social security)	7	0,52	1	0,04	-6	-0,48
59	Activities related to financial and insurance services	2	0,15	2	0,08	0	-0,07
60	Real Estate and Housing	8	0,59	5	0,21	-3	-0,39
61	Legal and tax advice, auditing	12	0,89	5	0,21	-7	-0,68
62	Administration and management of businesses; Management consultancy	2	0,15	4	0,17	2	0,02
63	Architectural and engineering offices; technical, physical, and chemical investigation	11	0,82	3	0,13	-8	-0,69
64	Research and Development	2	0,15	2	0,08	0	-0,07
65	Advertising and market research	2	0,15	3	0,13	1	-0,02
66	Other professional, scientific, and technical activities	1	0,07	2	0,08	1	0,01
67	Veterinary services	0	0,00	0	0,00	0	0,00
68	Rental of chattels	0	0,00	2	0,08	2	0,08
69	Placement and leasing of workers	2	0,15	1	0,04	-1	-0,11

70	Travel agencies, tour operators and provisions of other reservation services	3	0,22	3	0,13	0	-0,10
71	Guard and security services as well as detective agencies	2	0,15	0	0,00	-2	-0,15
72	Building maintenance; Gardening and landscaping	11	0,82	8	0,33	-3	-0,48
73	Business and personal services	4	0,30	2	0,08	-2	-0,21
74	Public administration, defence, social security	59	4,38	29	1,21	-30	-3,17
75	Education and teaching	58	4,31	38	1,59	-20	-2,72
76	Healthcare	32	2,38	18	0,75	-14	-1,63
77	Homes (excluding convalescent homes and holiday homes)	6	0,45	6	0,25	0	-0,20
78	Social affairs (without homes)	9	0,67	3	0,13	-6	-0,54
79	Creative, artistic and entertain activities	3	0,22	2	0,08	-1	-0,14
80	Libraries, archives, museums, botanical and zoological gardens	1	0,07	1	0,04	0	-0,03
81	Gaming, betting, and lotteries	0	0,00	0	0,00	0	0,00
82	Provision of sports, entertainment, and recreation services	4	0,30	1	0,04	-3	-0,26
83	Interest groups, church, and other religious associations (excluding social affairs and sports)	11	0,82	5	0,21	-6	-0,61
84	Repair of computing equipment and household goods	0	0,00	1	0,04	1	0,04
85	Provision of other mainly personal services	10	0,74	6	0,25	-4	-0,49
86	Private households with domestic staff	2	0,15	0	0,00	-2	-0,15

87	Private households (own consumption)	0	0,00	0	0,00	0	0,00
88	Extraterritorial organizations and bodies	0	0,00	0	0,00	0	0,00
89	Other branches	527	39,15	1948	81,27	1421	42,12
90	TOTAL	1346	100,00	2397	100,00	-370	

According to the results shown in the table above, it follows that the highest relative representation of women was recorded in the following branches of the economy in 2015:

Retail trade (excluding trade in motor vehicles)	6.09 %
Public administration, defense, social security	4.38%
Education and teaching.....	4.31%
Farming, hunting.....	3.79%
Gastronomy.....	2.67%
Healthcare.....	2.38%

Also, according to the results shown in the table above, it follows that the highest relative representation of women was recorded in the following branches of the economy in 2020:

Retail trade (excluding trade in motor vehicles)	1.92 %
Education and teaching.....	1.59%
Public administration, defense, social security.....	1.21%
Farming, hunting.....	1.00%
Wholesaling (excluding trade in motor vehicles)	1.00%

Then it is evident that **the biggest increase** in the real representation of women in 2020 compared to 2015 was recorded in the following branches of the economy:

Shipping.....	0.8%
Production, rental, and distribution of films and television programs and Cinemas.....	0.8%
Rental of moveable property.....	0.8%
Fisheries and aquaculture.....	0.4%
Extraction of oil and natural gas.....	0.4%
Coking plant and mineral oil processing.....	0.4%
Removal of environmental pollution and another disposal.....	0.4%

Also, it is evident that **the biggest decrease** in the real representation of women in 2020 compared to 2015 was recorded in the following branches of the economy:

Retail trade (excluding trade in motor vehicles)	4.53%
Public administration, defense, social security.....	3.43%
Farming, hunting.....	3.01 %
Education and teaching.....	2.97%
Gastronomy.....	2.17%
Healthcare.....	1, 77%

4.3 Model 3: Percentage of females and males per different wage groups

After the analysis of the representation of women in certain economic activities, this part presents the results of the analysis of the relative representation of women within the pay grades. Determining the structure of employed women regarding the pay rank is shown across 5 different ranges in monthly netto wages.

The following table shows data on the number of women in individual pay grades in 2015 and 2020.

Table 6: Number of women in individual pay grades (2015 and 2020)

ID	(Ranges /Euro)	2015		2020	
		Women	Total (female & male)	Women	Total (female & male)
1	0,00-2.500,00	616	887	809	1132
2	2.501,00 - 5.000,00	462	1098	970	2069
3	5.001,00-7.500,00	110	392	348	938
4	7.501,00-1.000.000,00	13	110	63	296
5	Over 1.000.000,00	6	66	37	189
	TOTAL	1207	2553	2227	4624

According to the results shown in the table above, women dominate in the salary range from 0 to 2.500 euros and in the salary range of 2.501 euros to 5.000 euros in 2020.

Table 7: Percentage of women in individual pay grades (2015 and 2020)

ID	(Ranges /Euro)	% Women in 2015	% Women in 2020
1	0,00-2.500,00	51,04	36,33
2	2.501,00 - 5.000,00	38,28	43,56
3	5.001,00-7.500,00	9,11	15,63
4	7.501,00-1.000.000,00	1,08	2,83
5	Over 1.000.000,00	0,50	1,66

According to the results shown in the table above, 51,04% of the total number of women in 2015 fell into the specified salary range of 2.500 euros per month. In 2020 most women fall into the specified salary range from 2.501 to 5.000 euros per month, precisely 43,56% of women.

4.4 Model 4: Shares of females and males employed in different regions in Austria

Finally, in this section is the employment of women by individual areas of residence analyzed.

The following table shows data on the number of employees, regarding gender and area, and the region of residence.

Table 8: Number of employees, regarding gender and area of residence

Employment place of work	2015			2020		
	Man	Woman	Total	Man	Woman	Total
Burgenland	30	25	55	45	49	94
Carinthia	63	76	139	141	119	260
Lower Austria	231	198	429	381	352	733
Upper Austria	249	204	453	418	381	799
Salzburg	100	72	172	149	139	288

Styria	171	164	335	338	327	665
Tyrol	125	118	243	205	170	375
Vorarlberg	57	48	105	114	98	212
Vienna	320	302	622	606	592	1198
TOTAL	1346	1207	2553	3382	3685	4624

Based on the data shown in the table above, the following table shows data on the structure of employed women regarding the area of residence in 2015 and 2020.

Table 9: Structure of employed women regarding the area of residence

Employment place of work	2015	2020
	%W	%W
Burgenland	2,07	2,20
Carinthia	6,30	5,34
Lower Austria	16,40	15,81
Upper Austria	16,90	17,11
Salzburg	5,97	6,24
Styria	13,59	14,68
Tyrol	9,78	7,63
Vorarlberg	3,98	4,40
Vienna	25,02	26,58

According to the data in the tables, it is evident that the most employed women in 2015 were in the region Wien (25,02%) and then in the Upper Austria 16,90% in 2015. In 2020 the most employed women were in region Wien as well (26,58%) and then in the Upper Austria 17,11%. Less employed person in 2015 were in Burgenland 2,07% and in 2020 2,20%. Employment place of work decreased in 2015 in Carinthia 6,30% on 5,34% in 2020 as well as in Lower Austria in 2015 16,40% on 15,81% in 2020 and Tirol in 2015 from 9,78% to 7,63% in 2020.

5 Conclusion

A regression model is estimated to explain individual gross hourly wages in Austria. To explain whether gender, age, place of work, work experience, level of education, number of employees in the workplace, and other chosen and above-mentioned variables affect the gross hourly wage in Austria.

Based on the results in the table above, can be concluded that women would have earned on average about 17,10 log points less than men in 2015. On the other side, women would have earned on average about 15,30 log points less than men in 2020.

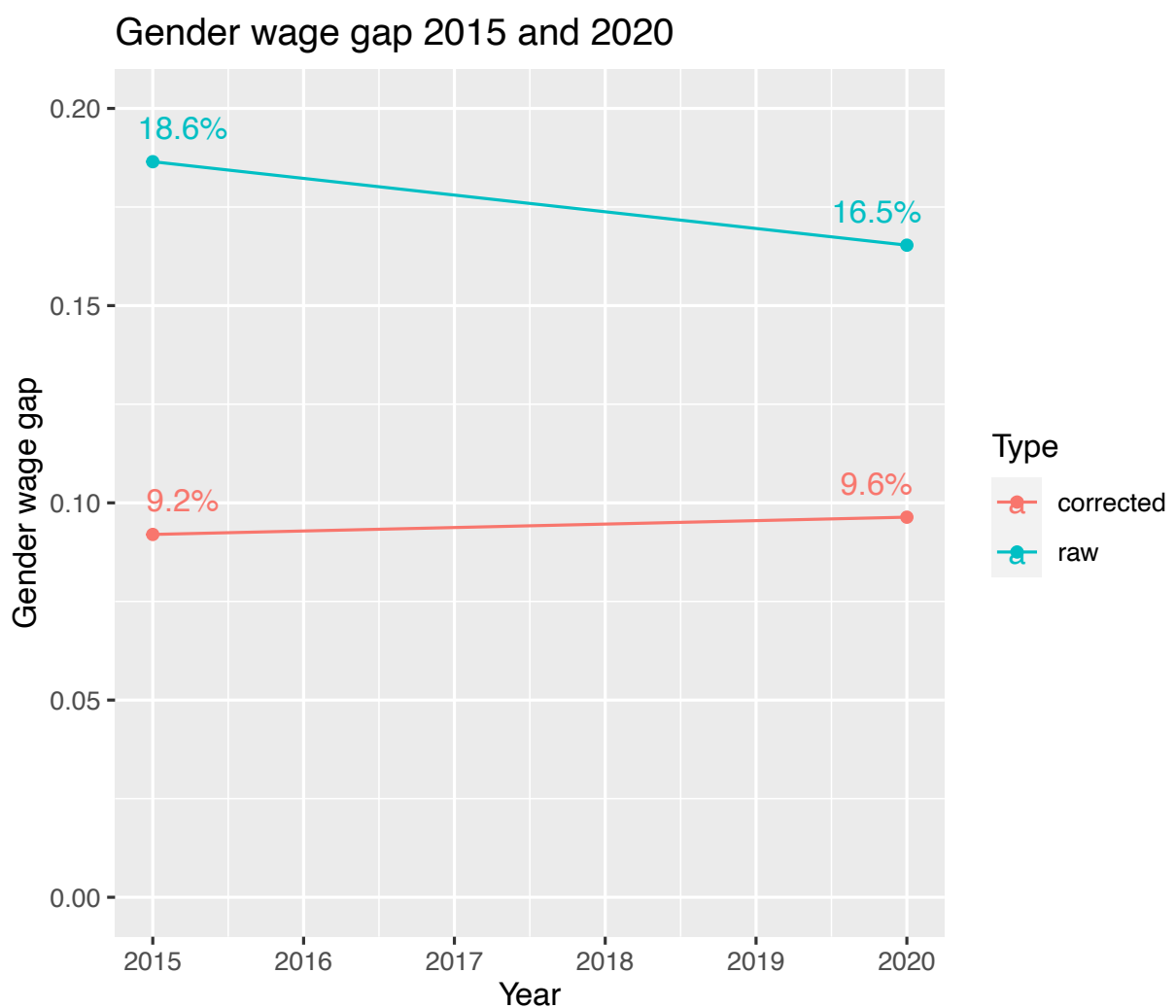


Figure 5: Comparison between the gender wage gap in 2015 and 2020 in present

The model shows that the education (High School Diploma) received a gross hourly wage (GHW) in 2015 of 32,90 log points more in comparison to other respondents like the education (Technical / Trade School). The model shows that the education (High School Diploma) received a gross hourly wage (GHW) in 2020 of 32,90 log points more in comparison to other respondents like the education (Technical / Trade School).

A closer look at the explanatory variable working part-time reveals that, for example, respondents who worked part-time received a gross hourly wage in 2015 of 7,90 log points less in comparison to other respondents who worked on a full-time basis that were not self-employed. On the other side, working full-time as a self-employed revealed that, respondents who worked on a full-time basis in their own company received a gross hourly wage in 2015 of 23,00 log points less than respondents that were working on a part-time basis as self-employed. A closer look at the explanatory variable working part-time reveals that, for example, respondents who worked part-time received a gross hourly wage in 2020 of 3,20 log points less in comparison to other respondents who worked on a full-time basis that were not self-employed. On the other side, working full-time as a self-employed revealed that, respondents who worked on a full-time basis in their own company received a gross hourly wage in 2020 of 58,40 log points less than respondents that were working on a part-time basis as self-employed.

Work experience is the next variable that are explaining the gender wage gap in this sample. Work experience (linear) shows that respondents with one year of experience received a gross hourly wage in 2015 of 52,48 log points more than respondents with less work experience. Work experience (quadratic) shows that respondents with years of experience received a gross hourly wage in 2015 of 13,57 log points less than respondents with less work experience. Work experience (linear) shows that respondents with one year of experience received a gross hourly wage in 2020 of 56,77 log

points more than respondents with less work experience. Work experience (quadratic) shows that respondents with years of experience received a gross hourly wage in 2020 of 8,47 log points less than respondents with less work experience.

Respondents that have position of leadership in 2015 received a gross hourly wage (GWH) of 17,10 log points more, than other respondents that are not working in the leadership positions. Respondents that had a position of leadership in 2020 received a gross hourly wage (GWH) of 22,00 log points more, than other respondents that are not working in leadership positions.

The model shows that the internship/praxis position workers (Students) received a gross hourly wage (GHW) in 2015 of 29,20 log points more in comparison to other respondents working in other positions. The model shows that the internship/praxis position workers (Students) received a gross hourly wage (GHW) in 2020 of 2,10 log points less in comparison to other respondents working in other positions.

Analyzing the type of contract can be concluded that respondents that worked with temporary contracts received a gross hourly wage in 2015 of 10,60 log points less in comparison to other respondents who worked with permanent contract types. Analyzing the type of contract can be concluded that respondents that worked with temporary contracts received a gross hourly wage in 2020 of 7,80 log points more in comparison to other respondents who worked with permanent contract types.

The results are shown in the tables in part 4.2. where the changes in shares of women and men separately in different fields of employment are explained it follows that the highest relative representation of women were recorded in the following branches of the economy in 2015: retail trade (excluding trade in motor vehicles) (6,09%), public administration, social security (4,38%), education and teaching (4,31%), farming, hunting (3,79%), gastronomy (2,67%) and healthcare (2,38%).

In 2020 the highest relative representation of women was recorded in the following branches of the economy: retail trade (1,92%), education and teaching (1,59%), public administration, social security (1,21%), farming, hunting (1,00%) and wholesaling (excluding trade in motor vehicles) also (1,00%).

The biggest increase in the real representation of women in 2020 compared to 2015 was recorded in the following branches of the economy: shipping (0,8%), production, rental, and distribution of film and television programs and cinemas (0.8%), rental of moveable property (0,08%), fisheries and aquaculture (0,4%), extraction of oil and natural gas (0,4%), coking plant and mineral oil processing (0,4%) and removal of environmental pollution and another disposal (0,4%).

The biggest decrease in the real representation of women in 2020 compared to 2015 was recorded in the following branches of the economy: retail trade (excluding motor vehicle trade) (4,53%), public administration, defense, farming, hunting (3,01%), education and teaching (2,37%), gastronomy (2,17%) and healthcare (1,77%).

Determining the structure of employed women regarding the pay rank is shown across 5 different ranges in monthly netto wages in section 4.3, women dominate in the salary range from 0 to 2.500 euros. According to the results 51,04% of the total number of women in 2015 and 36,33% in 2020 fall into the specified salary range. 43,56% of the total number of women in 2020 fall into the salary range from 2.501 to 5.000 euros.

Looking into a place of work by region in Austria it is evident that the most employed women in 2015 were working in Vienna (25,02%). In 2020 the most employed women were also working in Vienna as well, but the number of employees increased by 26,58%.

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Appendix

```
### Rekonstruktion
p_silc2015_ext <- read_sav("C:/Users/darija/Downloads/p_silc2016_ext.sav")
dat15 = p_silc2015_ext
#dat15 = dat15[dat15$pek_n>0,]
dat15 = dat15[dat15$P038003>0,]
table(dat15$sex)
dat15$Stundenlohn = dat15$P038003 / dat15$P030000 / 4.33
dat15 = dat15[dat15$Stundenlohn>0,]
dat15 = dat15[dat15$P033000>0,]
dat15$education = as.factor(dat15$P137000)
levels(dat15$education) =
c("Pflichtschule", "Lehre", "Fach/Handelsschule", "Matura", "Universitaet", "Andere_nach_Matura")
dat15$Familienstand = as.factor(dat15$P114000)
dat15 = dat15[dat15$Familienstand %in% c("1", "2", "3", "4", "5"),]
levels(dat15$Familienstand) =
c("ledig", "verheiratet_zusammen", "verheiratet_getrennt", "verwitwet", "geschieden")
dat15$Bundesland = dat15$P140000
dat15 = dat15[dat15$alter>24,]
dat15 = dat15[dat15$alter<66,]
dat15 = dat15[dat15$P140000<10,]

dat15$Branche = floor(as.numeric(dat15$P014000)/10)
dat15 = dat15[dat15$Branche>0,]
levels(dat15$Familienstand) = c("Single", "in Partnerschaft", "Single", "Single", "Single", "Single")
table(dat15$Familienstand)
levels(dat15$education) =
c("Pflichtschule", "Lehre", "Fach/Handelsschule", "Matura", "Universitaet", "Andere_nach_Matura")
dat15$Fuehrungskraft = (floor(dat15$P013000/10)== 1)
dat15$Gesundheit = as.factor(dat15$P102000)
levels(dat15$Gesundheit) = c("sehr gut", "gut", "mittel", "schlecht", "sehr schlecht")

dat15 = dat15

dat15$Hourly_Wage = dat15$Stundenlohn
dat15$Work_Experience = dat15$P033000
dat15$Type_of_employment = as.factor(dat15$P040120)
levels(dat15$Type_of_employment) =
c("employed_full_time", "employed_part_time", "self_employed_full_time", "self_employed_part_time",
  NA, "student", NA, NA, NA)

dat15$contract_type = as.factor(dat15$P020000)
levels(dat15$contract_type) = c(NA, NA, "permanent", "temporary")
table(dat15$Type_of_employment)
dat15$relationship_status = dat15$Familienstand
levels(dat15$relationship_status) = c("single", "in a relationship")
```

```

dat15$high_school_diploma = (dat15$education %in%
c("Matura", "Universitaet", "Andere_nach_Matura"))
dat15$position_of_leadership = as.factor(dat15$Fuehrungskraft)
dat15$state = as.factor(dat15$Bundesland)
dat15 = dat15[dat15$Bundesland > 0,]
levels(dat15$state) = c(NA, NA, "Burgenland", "Carinthia", "Lower Austria", "Upper
Austria", "Salzburg", "Styria", "Tyrol", "Vorarlberg", "Vienna")

levels(dat15$position_of_leadership) = c("no", "yes")
dat15$health_status = as.factor(dat15$Gesundheit)
levels(dat15$health_status) = c("very good", "good", "average", "poor", "very poor")
dat15 = dat15[dat15$P112000 > 0,]
dat15$Renouncement_to_Citizenship = (dat15$P112000 == 1)

variables_used <- c("Stundenlohn", "sex", "Renouncement_to_Citizenship", "Work_Experience",
"Type_of_employment", "contract_type", "relationship_status",
"high_school_diploma", "position_of_leadership", "health_status", "state")
dat15 <- dat15[complete.cases(dat15[, variables_used]),]
dat15 = dat15[dat15$P001010 > 0,]

model1 = lm(log(Stundenlohn) ~ sex, dat15)
summary(model1)
model215 =
lm(log(Stundenlohn) ~ sex + Renouncement_to_Citizenship + poly(Work_Experience, 2) + Type_of_employ
ment + contract_type + relationship_status * sex + high_school_diploma + position_of_leadership + health_st
atus + state, dat15)
summary(model215)

### Rekonstruktion
p_silc2020_ext <- read_sav("C:/Users/darija/Downloads/p_silc2021_ext.sav")
dat20 = p_silc2020_ext
#dat20 = dat20[dat20$pek_n > 0,]
dat20 = dat20[dat20$P038003 > 0,]
table(dat20$sex)
dat20$Stundenlohn = dat20$P038003 / dat20$p030000 / 4.33
dat20 = dat20[dat20$Stundenlohn > 0,]
dat20 = dat20[dat20$P033000 > 0,]
dat20$education = as.factor(dat20$P137000)
levels(dat20$education) =
c("Pflichtschule", "Lehre", "Fach/Handelsschule", "Matura", "Universitaet", "Andere_nach_Matura")
dat20$Familienstand = as.factor(dat20$P114000)
dat20 = dat20[dat20$Familienstand %in% c("1", "2", "3", "4", "5"),]
levels(dat20$Familienstand) =
c(NA, "ledig", "verheiratet_zusammen", "verheiratet_getrennt", "verwitwet", "geschieden")
dat20$Bundesland = dat20$P140000
dat20 = dat20[dat20$alter > 24,]
dat20 = dat20[dat20$alter < 66,]
dat20 = dat20[dat20$P140000 < 10,]

dat20$Branche = floor(as.numeric(dat20$P014000)/10)

```

```

dat20 = dat20[dat20$Branche>0,]
levels(dat20$Familienstand) = c("Single", "in Partnerschaft", "Single", "Single", "Single", "Single")
table(dat20$Familienstand)
levels(dat20$education) =
c("Pflichtschule", "Lehre", "Fach/Handelsschule", "Matura", "Universitaet", "Andere_nach_Matura")
dat20$Fuehrungskraft = (floor(dat20$p013000/10)== 1)
dat20$Gesundheit = as.factor(dat20$P102000)
levels(dat20$Gesundheit) = c("sehr gut", "gut", "mittel", "schlecht", "sehr schlecht")

```

```

dat20 = dat20

```

```

dat20$Hourly_Wage = dat20$Stundenlohn
dat20$Work_Experience = dat20$P033000
dat20$Type_of_employment = as.factor(dat20$P040120)
levels(dat20$Type_of_employment) =
c("employed_full_time", "employed_part_time", "self_employed_full_time", "self_employed_part_time",
  NA, NA, "student", NA, NA, NA)

```

```

dat20$contract_type = as.factor(dat20$P020000)
levels(dat20$contract_type) = c(NA, "permanent", "temporary")
table(dat20$Type_of_employment)
dat20$relationship_status = dat20$Familienstand
levels(dat20$relationship_status) = c("single", "in a relationship")
dat20$high_school_diploma = (dat20$education %in%
c("Matura", "Universitaet", "Andere_nach_Matura"))
dat20$position_of_leadership = as.factor(dat20$Fuehrungskraft)
dat20$state = as.factor(dat20$Bundesland)
dat20 = dat20[dat20$Bundesland>0,]
levels(dat20$state) = c(NA, NA, "Burgenland", "Carinthia", "Lower Austria", "Upper
Austria", "Salzburg", "Styria", "Tyrol", "Vorarlberg", "Vienna")

```

```

levels(dat20$position_of_leadership) = c("no", "yes")
dat20$health_status = as.factor(dat20$Gesundheit)
levels(dat20$health_status) = c("very good", "good", "average", "poor", "very poor")
dat20 = dat20[dat20$P112000>0,]
dat20$Renouncement_to_Citizenship = (dat20$P112000 == 1)

```

```

variables_used <- c("Stundenlohn", "sex", "Renouncement_to_Citizenship", "Work_Experience",
  "Type_of_employment", "contract_type", "relationship_status",
  "high_school_diploma", "position_of_leadership", "health_status", "state")
dat20 <- dat20[complete.cases(dat20[, variables_used]), ]
dat20 = dat20[dat20$P001010>0,]

```

```

model1 = lm(log(Stundenlohn)~sex, dat20)
summary(model1)
model220 =
lm(log(Stundenlohn)~sex+Renouncement_to_Citizenship+poly(Work_Experience,2)+Type_of_employ
ment+contract_type+relationship_status*sex+high_school_diploma+position_of_leadership+health_st
atus+state, dat20)

```

```
summary(model220)
```

```
stargazer(model1,model220)
```

```
Wage_Gap = exp(c(0.171, 0.088, 0.153, 0.092))-1
Year = c(2015,2015,2020,2020)
Type = c('raw','corrected','raw','corrected')
position = c(2015.2,2015.2,2019.8,2019.8)
df = data.frame(Wage_Gap,Year,Type,position)
ggplot(df, aes(x=Year, y=Wage_Gap, col=Type)) +
  geom_line() +
  geom_point() +
  geom_text(aes(label=paste0(round(Wage_Gap*100, 1), "%"),x = position,vjust=-1) +
  ylab('Gender wage gap') +
  ylim(c(0, 0.20)) +
  ggtitle('Gender wage gap 2015 and 2020')
```

```
#####
```

```
tab1 = dat15 %>% group_by(sex) %>% summarize(hourly_wage= mean(Stundenlohn),hours_worked =
mean(P030000),observations= n())
tab2 = dat20 %>% group_by(sex) %>% summarize(hourly_wage= mean(Stundenlohn),hours_worked =
mean(p030000),observations= n())
rbind(tab1,tab2)
```

```
#####
```

```
dat15$Gender = as.factor(dat15$sex)
levels(dat15$Gender) = c("male", "female")
dat20$Gender = as.factor(dat20$sex)
levels(dat20$Gender) = c("male", "female")
ggplot(dat15,aes(x=Stundenlohn))+geom_histogram()+facet_grid(.~Gender)+xlab("Hourly
wage")+xlim(c(0,50))+ggtitle("Distribution of hourly wages 2015")
ggplot(dat20,aes(x=Stundenlohn))+geom_histogram()+facet_grid(.~Gender)+xlab("Hourly
wage")+xlim(c(0,50))+ggtitle("Distribution of hourly wages 2020")
```