The Gender Pay Gap in The Netherlands: Trends From 2005-2018

Jurjen W. Bos (S2501554)

Dr. E. Suari-Andreu

Dr. M. Knoef

Universiteit Leiden

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Abstract

Recent reports show conflicting results about the gender pay gap in the Netherlands, providing no conclusion about whether it is widening or shrinking. Decreasing the gender pay gap can have positive results on the economy. This paper aims to looks at the developments of the gender pay gap from 2005 to 2018, putting extra emphasis on the gender participation gap. Using an ordinary least-squares regression, it analyzes data from the Dutch Household Survey (DHS) to analyze the extent to which the pay gap can be explained by several theories, such as human capital theory and comparable worth theory. The paper finds a shrinking, though significant pay gap: between 2005 and 2018, where the pay gap including controls decreased from 22.9% to 15.3%. Evidence is found for the human capital theory, but no conclusion was found for the other theories. A recent development where young women earn more than young men on average is found. This can be attributed to younger women having a higher average education level. However, there is still a significant pay gap between men and women in the Netherlands, with women drawing the short straw. On the basis of these results, it is recommended that the government takes further action to decrease the pay gap as much as possible. As not all variables could be taken into account, further research should be done including more control variables to determine to what extent the pay gap can be explained.

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1. Introduction

Recently, the debate over the gender pay gap in the Netherlands gained renewed traction, when Dutch magazine Intermediair together with business university Nyenrode found that the pay gap was not shrinking, as expected, but widening from 2017 to 2019 (Van Muijen & Melse, 2019). In contrast, Statistics Netherlands found a decrease in the pay gap in 2018, so there is no consensus on whether the pay is increasing or decreasing (Statistics Netherlands, 2020a). Therefore, further research is necessary to investigate what the data says. The aim of this research is to look at the gender pay gap in the Netherlands. It specifically looks at the development of this gap over the last 14 years. It asks the question: what does the development of the gender pay gap in the Netherlands from 2005 to 2018 look like?

The pay gap between men and women is something that has been a topic of discussion for decades. The pay gap is usually presented as the difference in mean hourly wage between men and women, expressed in absolute wage difference or percentual difference of women's average wage compared to the average wage of men. The gap is typically calculated in two ways: uncorrected and uncorrected. The uncorrected gap is the absolute difference between the average pay of men and women, whereas for the corrected gap, the calculation takes into account controls for different factors, such as hours worked and experience.

Labor force participation is an important topic which is inherently connected to the pay gap, as receiving wages depends on employment and the extent of that employment. And also, because the number of women in the labor force influences the size of the pay gap. This paper highlights the role of participation in the gender pay gap, as especially in the Netherlands participation plays a large role in the labor market participation of women, since 68% of women work part time.

Many of the influential papers that have been written about this topic, as well as those that focus on the Netherlands, are quite dated, most of them being over a decade old (Albrecht et al., 2004; Arulampalam et al., 2007; Blau & Kahn, 2001; de Ruijter et al., 2003; Rubery et al., 2005). The most recent academic article on the pay gap in the Netherlands focuses on data that is over a decade old (Fransen et al., 2012). Since then, some new policies as well as general structural changes have been introduced that could cause changes in the pay gap. Furthermore, there are no academic articles about the pay gap in

the Netherlands that take the new development of younger women being paid more than their male counterpart into account (Statistics Netherlands, 2016), which will be elaborated upon in this paper. Thus, there is space for new research both renewing older research as well as exploring new factors that could impact the pay gap.

The gender pay gap is an important issue in terms of equity and equality of opportunities. Moreover, research shows that if the gap is decreased it would result in positive consequences for the economy. Research by McKinsey, a consultancy company, showed that the GDP of the Netherlands could be 100 billion euros higher if the participation, the number of paid hours and the occupation differentiation of women were the same as in the best-performing countries in the EU (Graven & Krishnan, 2018). Research done on behalf of the Committee on Women's Rights and Gender Equality showed that for every per cent that the pay gap is reduced, GDP increases by 0.1% (Del Monte, 2013). Furthermore, if more women would work and/or earn a higher wage, the welfare expenses of the country would go down as the government would not have to supplement women's income after divorce and after retirement (Graven & Krishnan, 2018).

The policies that are included in the research fall into three categories: policies influencing participation, policies that directly influence pay, and those with ambiguous effects. The policies taken into account in this paper are all introduced after 2005. This year is chosen as not much academic literature has analyzed data after this date, and it was the year of the introduction of an important policy: the increase in day care subsidy.

The research is carried out using an ordinary least-squares linear regression. Using this method, the pay gap is analyzed with and without the interference of control variables. Furthermore, the pay gap is measured for different education levels and by age groups. The data that is used is that of the DHS-panel (Dutch Household Survey), conducted by CentERdata, which is affiliated with Tilburg University. The survey provides data on 2000 Dutch households annually. For this research, data from 2005-2018 is used. This is because 2018 is the most recent year with data available. The data provides probability-based samples of the Dutch population and contains information about mainly economic, financial and personal concepts and characteristics.

The strength of this paper lies in its combination of participation and pay difference, which are often separated in the research. The two are very related however, and it is important to mention both when writing about the gender gap. This is especially the case in

the Netherlands, which is known for its part time labor culture, where women work relatively few hours. This creates a big difference not only in terms of pay, but also in the participation of women. Women participate on a large scale, but they work few hours.

The paper is structured in the following way: the second section focuses on the current state of the gender gap in the Netherlands, both in terms of pay and participation. The third section will do a short review of the relevant literature and theories that are relevant to explaining the pay gap. Section four will review existing policies in the Netherlands, as well as place them in an international perspective. The fifth section will elaborate on the data used and provide descriptive statistics. The sixth section will present the results. Finally, the seventh section will conclude and provide a few policy recommendations.

2. The Gender Gap in the Netherlands

This section provides the current situation of the gender gap in the Netherlands based mainly on the 2018 biannual emancipation monitor released by Statistics Netherlands together with the Netherlands Institute for Social Research (Portegijs & van den Brakel, 2018). In the emancipation monitor, the position of women in the Dutch society is looked into, and the developments over time are analyzed. This section starts by looking at the pay gap, and then at the gender gap in terms of participation.

2.1 The Pay Gap

It is important to distinguish between the corrected and the uncorrected pay gap. Whereas the uncorrected pay gap reflects the gross difference between the average wage of men and women, the corrected pay gap is then what is left after taking into account factors that researchers think are relevant. Statistics Netherlands, for example, corrects the pay gap using three different characteristics: Those of the employee, those of the employer and those of the job. Characteristics of the employee comprise factors such as age, ethnicity, education, et cetera. Employers' characteristics are the sector, number of employees, share of women, et cetera. And finally, the characteristics of the job are type of contract, level of the job, full or part-time, et cetera (Portegijs & van den Brakel, 2018). The part of the pay difference that cannot be explained by these characteristics is the unexplained part. Statistics Netherlands stresses that this does not mean that this part of the pay gap is necessarily caused by pay discrimination (Portegijs & van den Brakel, 2018). Pay discrimination would occur when equal work does not result in equal pay. With the current data available, Statistics Netherlands cannot define what part of the pay gap would be attributed to discrimination. This is because they are unable to measure what equal work and equal pay is (Portegijs & van den Brakel, 2018). If this could be measured, there would not be an unexplained part of the pay gap. It would be explained and attributed to pay discrimination.

As mentioned in the introduction, recent research conducted by Dutch magazine Intermediair together with Business university Nyenrode resulted in a lot of media coverage when they found that the pay gap was not decreasing, as expected, but increasing from 2017 to 2019 when corrected using economic and demographic controls (Van Muijen &

Melse, 2019). They conducted a survey amongst 44,198 employees and self-employed professionals and weighed them using the population in the Dutch National Labor Market Research (NOA) to get a representative sample. The finding of a widening pay gap is in contrast with the data of Statistics Netherlands, which in 2018, published numbers showing a stagnation, but no widening gap (Statistics Netherlands, 2020a). They found that the uncorrected pay gap in the Netherlands is 19 percent for the private sector and 8 percent for the public sector, corrected using the aforementioned factors these are 7 and 5 percent respectively (Muller et al., n.d.).

Recently a new trend has emerged, as young women are currently earning more than young men on average. However, the gap is still apparent at the group of older women, who still earn less than men. This turning point is at the age of 36 in government, whereas in the private sector it is after the age of 30 (Statistics Netherlands, n.d.). This is a cohort effect, since the reason for the decrease is the increase in education levels of women in this cohort. This is a recent trend and does not have to do with the age of women. This does not mean, however, that this trend will last. Perhaps after a large part of this group of women becomes mothers, the pay gap will increase again.

2.2 The Participation Gap

Next to the gender gap in terms of pay, the gap in terms of participation is also important. The two issues are of course related, as both the fact of participation and the extent to which one participates determines one's pay: if women do not participate in the labor market they will not receive a wage, and when they work part time they will receive a lower wage than those working full time. It is therefore relevant to also explore the gap in terms of participation, as this might reveal some of the underlying reasons for the gap in terms of pay.

In the most recent version of the biannual emancipation monitor, the authors diagnosed an upward trend in labor market participation of women (Portegijs & van den Brakel, 2018). After the economic crisis of 2008, there was a stagnation in the growth of participation by women. In 2018, participation started going up again and the number of hours worked also increased. On average, women work 28 hours per week (Portegijs & van den Brakel, 2018). In a survey (Enquête beroepsbevolking) conducted by Statistics Netherlands used in the emancipation monitor, women indicated that they would like to work 29 hours, so there is a

small difference here (Portegijs & van den Brakel, 2018). For men, the average work week is 39 hours, which is also the number of hours they would like to work. Furthermore, almost 80% of the women working part-time would like to work more if their circumstances were different. For instance, if they could combine their work better with their private life. Examples of this are different working times, a shorter commute and working from home (Portegijs & van den Brakel, 2018).

A big effect on the labor market participation of women is having children (Portegijs & van den Brakel, 2018). However, in 2017, women with a partner and young children worked on average half a day more than women in the same situation in 2007. Nevertheless, having children still has a larger effect on women than on men (Portegijs & van den Brakel, 2018). Mothers have work less often, work less hours, and are not as economically self-sufficient as fathers and young women without children. Most men work full time, also after having children (Portegijs & van den Brakel, 2018). Furthermore, fathers take care of children for one third of the time, the rest of the care is done by mothers. Most parents say they would like to split the work equally, but only 40% of parents succeed in this (Portegijs & van den Brakel, 2018).

The emancipation monitor found that women with a lower education have work less often, work less hours and are less economically self-sufficient than those with a higher education (Portegijs & van den Brakel, 2018). However, for both groups, participation and number of hours worked have increased since 2005, but the difference between them has remained stable (Portegijs & van den Brakel, 2018).

Most women in the Netherlands work part-time and they are known as the 'European Champion' of part-time work for women, meaning out of all European Union states, Dutch women work part-time most often (Portegijs & van den Brakel, 2018). Elaborating on this, in terms of the pay gap, the Netherlands is not doing well compared to other EU countries. Its uncorrected pay gap is on the 19th place of the 28 EU countries, according to the European Commission (n.d.). In the Netherlands, people that work part time in the private sector earn 4.4% less per hour than those working full time when the two jobs are comparable (Breemer & Frijters, 2019).

3. Literature Review and Theories

In this section, first the reasons of wage difference that were found by the Netherlands Institute for Human Rights are highlighted. After this, the importance of norms and values will be discussed. Then, theories that aim to explain a part of the pay gap are explored.

3.1 Reasons for Wage Differences

Reasons that women earn less than men vary, and they are different per sector. The Netherlands Institute for Human Rights has done research into pay gaps in three different sectors: hospital, insurance companies and vocational colleges. Although very different results were found for each sector, in each of them a pay gap was found (The Netherlands Institute for Human Rights, 2011, 2016, 2018). In all of them, one of the factors resulting in a lower salary for women is salary negotiations (The Netherlands Institute for Human Rights, 2011, 2016, 2018). The institute had ruled before that the salary should not be determined by someone's negotiation skills, and it is up to the employer to counteract this. Furthermore, important factors that influenced the pay gap were that wage was often based on previously earned wages, not giving correct weight to experience (an overestimation or an underestimation), and giving salary guarantees after reforms or for other reasons (The Netherlands Institute for Human Rights, 2011, 2016, 2018). The result of their three reports show that these factors are not being combatted effectively.

3.2 Norms and Values

In academic literature, no consensus is found on how much of an influence norms and values have on the pay gap; results range from 2 to 32 per cent of the pay gap (Blau & Kahn, 2017).

Furthermore, it is not necessarily out of free choice that women work part time, as there are many societal influences and norms and values that influence this decision, such as pressure to take care of one's own children as much as possible, and not use day care. In their research, Aarntzen et al. (2019) explicate three mechanisms that discourage women in a heterosexual relationship from focusing on their careers, which will be highlighted here.

First, there are feelings of guilt that stimulate women to work part time. When facing a conflict between work and family, societal norms predicate that women should choose family, while men should put their careers first. The difference between men and women is that women often feel guilty when their career conflicts with their family and men do not. This results in women often reducing the hours they work, which contributes to the large number of women working part time in the Netherlands (Aarntzen et al., 2019).

Secondly, the way that roles are expected to be divided in heterosexual relationships is in such a way that the man is more successful in his career than the woman. This pressure can result in women working part time to not seem more successful than their partner (Aarntzen et al., 2019). Third, when women become mothers, they usually take to the traditional division of labor and care tasks; the man works more, and the woman takes care of the children. Typically, it is presupposed that this division arises because parents already had traditional values before having a child. However, this is not always the case, as being a parent also makes parents have more traditional values (Aarntzen et al., 2019). The reason for this is that new parents face a lot of new situations. When making decisions about these new situations parents often rely on what is the norm and stick to habits created during maternity and paternity leave, where usually mothers spend most time with the child. This was the case for all groups but one: mothers with higher education that worked a high number of hours and were relatively old when they had their first child. This group had a more equal division of work and care tasks. The reason for this is likely that these women were older than other mothers when having their first child. They already had a less traditional experience of motherhood, and therefore were less sensitive to outside norms (Aarntzen et al., 2019).

Mothers are more likely than fathers to take a hiatus from work when having children and therefore have less experience and are less inclined to follow further education or training (de Ruijter et al., 2003). Furthermore, mothers often also suffer consequences because of this hiatus (de Ruijter et al., 2003). This can have multiple reasons: firstly, a mother might switch employers after having a child, switching to a job they think is more suited to a life with children. Secondly, because women are expected to become mothers, this could deter employers from making large investments in their female employees, as employers expect mothers to work less than men (Blau & Kahn, 2017). Finally, mothers may

face discrimination by their employers. There is quite some evidence for this last point, explicated by Blau & Kahn (2017).

Furthermore, there are some differences between the two genders in terms of skills, there is no conclusion on whether this is caused by nature or nurture, but the differences do exist (Blau & Kahn, 2017). For example, women are less likely to negotiate and compete, and more likely to be risk averse. Contrary to this, it has been shown that women are more likely to have better interpersonal skills (Blau & Kahn, 2017).

The report written by Intermediair and Nyenrode elaborate upon this, writing that there are certain skills that are viewed as typically male, and other that are regarded as typically female by the respondents of their survey (Van Muijen & Melse, 2019).Men are better at separating work and private life, networking, being concise and they are more dominant. Women are better at seeing details, leaving space for others, admitting their own mistakes and stimulating team work (Van Muijen & Melse, 2019). These attitudes can make a difference when these are traits that are looked for in a job interview, meaning men might be hired for certain occupations sooner than women, and vice versa.

The use of day care is an important determinant of the participation of women (Portegijs et al., 2006). A large factor determining whether children are brought to day care is is the opinions of parents. Many parents think it is best to take care of children themselves; In the Netherlands, three quarters of mothers was of the opinion that child care should not or for a maximum of one or two days per week be done by others (Salm, 2006). The norm in the Netherlands is that women who have a child under the age of four should have a job for 2-3 days per week (Portegijs et al., 2006). Not only do these mothers think it is better when parents take care of their own children, they also doubt the quality of the day care (Portegijs et al., 2006). This can be a factor in explaining why the law was perhaps not as successful as it could have been. By making day care more accessible, this policy has possibly also aided in changing the values surrounding day care. In 2018, rather than three quarters of mothers in 2005, 42% thought that day care was not good for a child and for toddlers. This number was less than 30% for older children (Portegijs & van den Brakel, 2018).

There is also a large amount of shame tied to working as a mother, as others might perceive them as lesser mothers, and they might do so themselves too (Fortin, 2005). This is known as mother's guilt.

3.3 Theories

The factors in the pay gap that are controlled for when calculating the corrected pay gap are still very interesting to take into account as they can reflect inequality of opportunities rather than only differences in background between men and women in the labor force. Therefore, it is interesting to look at the theories behind the factors that are controlled for.

Fransen et al. (2012) provide an overview of previous research done into the pay gap in the Netherlands and the theories that were tested in these papers. They concluded that many of the studies done in the Netherlands focused on only one aspect of the pay gap, not accounting for the actual reason women earned less than men. Their research showed that that the unexplained part of the pay gap is likely to be caused by differences in unobserved characteristics, such as norms and values, as well as discrimination (Fransen et al., 2012). Furthermore, it might matter that skills which are typically regarded as 'female' are not tested in interviews or not valued as much as other skills, such as social or communicative abilities (de Ruijter et al., 2003). Fransen et al. introduce two theories that aim to explain the pay gap. These are important throughout the entire pay gap literature: human capital and comparable worth. Furthermore, it is also important to take into account the distribution of the wages, which is why the theory of sticky floors and glass ceiling are also discussed. This next section will discuss these three topics.

3.3.1 Human Capital. Within the literature on the pay gap, a theory often mentioned is that of human capital. This theory was popularized by Becker and Mincer & Schulz and it holds that human capital is the stock of different attributes that are used in labor to produce economic value (Blau & Kahn, 2017). Examples of human capital are experience and education. In terms of the pay gap, the differences in human capital between men and women are discussed. These can perhaps explain part of the gap in wages between the two genders. Applying human capital theory, it could also imply that women receive a lower income because they are less likely to regain their investments in human capital from their labor. Women do not assume to get as much return on their investment in education as men, thus they are less likely to invest in their own human capital. Because of this, employers are also less likely to invest in the human capital of female employees (Blau & Kahn, 2017; de Ruijter et al., 2003).

Fransen et al. (2012) found that the human capital factors age, education and experience have a very large influence on determining the wage of a person in the Netherlands between 1996 and 2006. However, they found that the value of experience decreased over that decade. Whereas in 1996, 15 years of experience resulted in a wage that was 33% higher than that of an inexperienced person, in 2006 this was only 18%.

3.3.2 Personnel economics. The argument of personnel economics is that rather than companies and employees focusing on human capital, they focus on the hours worked and the availability of employees. In some occupations, there is a large wage penalty for limited availability, as there are very rigid deadlines, contacts that need to be held and work that is not easily substituted by others. In these kinds of occupations, like lawyers in high-end law firms, there is a penalty for working less hours and taking a hiatus. This wage penalty is not because of differences in human capital then, but because the job itself calls for reliability. Furthermore, employers might also prefer employees willing to work full time, as it signals they are hard workers (Blau & Kahn, 2017). This might explain why women earn less than men in the Netherlands: women work part time more often. If most high-paying jobs are only available in full time, there is a bigger chance it would be given to a man, since they are more likely to look for a full time job.

3.3.3 Comparable worth. The comparable worth theory states that gender influences the value of labor in the sense that a certain occupation that is dominated by one gender is stereotyped and associated with that gender. Through gender bias this means that those in occupations that are considered typically female get paid less than their typically male counterparts. Furthermore, men working in a female-dominated industry will also earn less, and women who work in a male-dominated industry will earn more. It is often the case that men have more human capital and work in higher positions and therefore earn more (de Ruijter et al., 2003). Comparable worth theory is not about these cases, but cases in which comparable jobs are paid differently. This can be attributed to a different cultural valuation of work done by men and women. The reason for this is institutionalized norms, where the jobs done by women do not fit in the framework for how jobs are valued, and therefore their pay is lower (de Ruijter et al., 2003).

3.3.4 Glass ceilings and sticky floors. The theories of glass ceilings and sticky floors are about the distribution of men and women across positions in the labor market. The difference between glass ceilings and sticky floors is that where a glass ceiling is an invisible

barricade that women cannot surpass in terms of wage, a sticky floor means that women are less likely to start increasing their wages at all and remain in the jobs with the lowest wages. The glass ceiling is an increasing gender gap towards the top of the wage distribution, meaning there are relatively more men in high-wage jobs. Sticky floors symbolize the widening near the bottom of this distribution, meaning there are relatively more women in low-wage jobs (Arulampalam et al., 2007). In the Netherlands, according to Albrecht et al. (2004) there is a glass ceiling effect. They found that women do relatively well in low-paid jobs, getting higher wages as they gain more experience, so there is no sticky floor in the Netherlands for women. However, there is a glass ceiling, as women do not surpass a certain point in the wage distribution, meaning there are relatively few women in high-paid positions.

4. Policies

Over the last 15 years, various policies have been introduced impacting the gender pay and participation gap, most focusing on the participation on women. In this section, these policies will be explicated. Firstly, the policies directly influencing pay, then those influencing participation, and finally those that have an ambiguous effect.

There are few policies that aim to directly influence the pay gap. Since 2005, there were none of these in the Netherlands except for the equal pay act from 1985. For the sake of completeness, examples from Iceland and other countries are mentioned to see what such a policy could be like. Policies influencing participation that are relevant to explore are changes in day care subsidies and changes in tax credits. Beyond these, additional initiatives have been employed, aiming to reduce the pay gap. However, many of these policies were mostly on a (local) project base (Bussemaker, 2013; van Engelshoven, 2018). It is very hard to analyze the effects of these projects on labor market participation as they do not change the situation for an entire group of people in the Netherlands at the same time, and it is hard to see the effect of for instance an informational campaign. This means analyzing them is beyond the scope of this research. Nevertheless, they are still important policies to mention to get a gist of the general trend of policies in the Netherlands.

4.1 Policies Directly Influencing Pay

In 2019, members of four parties in the Netherlands (SP, GroenLinks, PvdA and 50PLUS) made a legislative proposal for a law that would expand upon the current equal pay act installed in 1980 (Tweede Kamer der Staten-Generaal, 2019). This law forbade the discrimination of employees on the basis of sex. Both men and women can appeal to this act. The reason for the proposed amendment is that the burden of proof now lies with the discriminated person themselves; they have to start the process. The initiators of the amendment want to shift this burden of proof to the employer. Not only should the employer supply the proof, but this should be done structurally. A certification system would be installed, where employers of companies that have more than 50 employees should provide anonymized gross pay and descriptions of functions every three years. They will be checked and if there is equality between men and women the company will get a certificate. If this is not the case, the company gets a chance to improve, and if they do not

they will get a fine (Tweede Kamer der Staten-Generaal, 2019).

Currently, this is not the case however, and the burden of proof is still with the employee. In other countries, similar laws have been passed. In Iceland, a law was installed in the beginning of 2018, which made it mandatory for companies that have more than 25 employees to proof they pay men and women the same amount (Werk.en.de Toekomst, 2019). It is thereby the first country that rendered the pay gap effectively illegal, starting in 2022 (van der Kaaden & Sterk, 2018). If there is no equality in pay, companies have to set up a 12-month plan to improve their situation (Bjarnadóttir, 2020). Other countries, such as France, have installed penalties for companies that do not achieve a minimum level of equality in their pay levels (Bjarnadóttir, 2020). Germany, the UK, Denmark, Italy, France and Belgium have shifted the burden of proof to the companies: when asked, the companies should provide information on their pay gap (van der Kaaden & Sterk, 2018).

4.2 Policies Influencing Participation

4.1.1 Day care. In January of 2005, the 'Wet Kinderopvang' (Law day care) was introduced to make it more a more attractive option to send children to day care. Before that, there were some policies in place to aid in the payment for day care, however in 2005 these were centralized to make it easier for everyone to use day care. The reason for the introduction of this policy was stimulating women to work more. Two additions were made to the law in 2006 and 2007, attempting to make day care affordable for everyone. In 2008, parents were paying 20% of the costs, which was 30% in 2006 (Banning, 2008). During this period, there was also an increase in the labor market participation of women. However, at the time, Statistics Netherlands and The Netherlands Institute for Social Research said it was difficult to make a causal connection (Vos, 2008).

After the financial crisis in 2009, there were cuts in the subsidies for childcare. The costs then got back to around the same level as in 2005 (Vos, 2011). In 2014, the subsidy went up again, especially for the highest incomes. In 2019 it went up even more, for everyone. Currently parents in the highest income sector get 80% of the price subsidized, whereas for those with the lowest income 96% of the costs are covered by the subsidy (Boersema, 2018; Jongen, 2010).

Statistics Netherlands found that the increase in subsidies for day care increased participation of women with young children by 2.5 percentage point from 2004 to 2009,

which was 26% of the total increase in participation. When looking at subgroups, no effect was found on the participation of women that had a lower education. They explain that it is likely that this is because the subsidy mainly reduced the parental contribution for middle and high-income groups. The effect on participation for women from middle and higher-income groups was a 4 percentage point increase. Furthermore, on average there was an increase of 1.1 hours worked per week for women. For men, no difference in participation was found (Jongen et al., 2011).

4.1.2 Combination discount. The combination discount is a tax break aimed at single mothers or those that earn less than their partners. Like the day care subsidy, it has changed a lot over the years. Its goal is also similar to the day care subsidy: increasing labor market participation of mothers. A mother receives the combination discount if she is a single mother or earns less than her partner. This is meant to stimulate women to work (more): the more hours worked, the higher the discount. It was initially implemented to stimulate the large number of women that did not return to the labor market after becoming a mother to do so. It was initially implemented in 2001, and the discount was increased a few times before 2005 (Ministerraad, 2005)**.**

In 2008, it was mentioned that this combination discount would reduce the marginal tax pressure faced by the second earner of a family (Van der Ploeg, 2009). If this pressure is high, then increasing the wage of the second earner does not have much effect: working more provides no real financial incentives for the second earner. The reason for this is the progressive tax system that trickles through in multiple instances. If the wage goes beyond a certain amount this means more income tax needs to be paid, the contribution for day care increases, as this is income dependent, and finally benefits such as rent allowance may be retracted if income is too high. To combat this pressure, the combination discount was increased in 2008, and was made more dependent on income in 2009 (Van der Ploeg, 2009).

4.1.3 Other tax breaks. To make working more attractive for the second earner, Two policies were introduced besides the combination discount: firstly, the reduction of the general tax credit: Before 2008, the second partner could get an additional tax credit based on the income of the first partner if they had a low wage or no work. From 2009 onwards, this is gradually decreased to stimulate (re-)entering the labor market (Plasterk, 2007). Secondly, the labor tax credit was increased from 2008 onwards, and made dependent on income from 2009 onwards. This also made working more attractive relative to receiving

unemployment benefits (Plasterk, 2007). The labor tax credit was increased again in 2019 (van Engelshoven, 2018).

4.3 Policies With an Ambiguous Effect

Project-based and other policies included in these section are called ambiguous because their effects cannot easily be measured. In the Netherlands, these current projects are mainly aimed at raising awareness. These are projects such as a radio program about diversity in entrepreneurship and activities, organized by Women Inc.. The aim of this program is to make employers and women aware of the pay gap. An example of an activity organized by Women Inc. Is the '#15procentminder' (15 per cent less) campaign, raising awareness of the pay gap, and the 'Gelijk Loon Check' (equal pay check), a tool that employers can use to check whether wages are equal for men and women (Ark, 2019; Women Inc., n.d.). Another example is the project 'Economic Independence of Women', subsidized by the Ministry of Education, Culture and Science. This project takes place at the municipal level and stimulates women with a distance from the labor market to become economically independent (van Engelshoven, 2018; ZonMw, n.d.).

In 2012, the minister for Ministry of Education, Culture and Science set a target that 30% of the board of directors and the supervisory board of publicly-traded companies should be women (Bussemaker, 2013). This target had a limited effect, so the minister decided to propose a law to make the target compulsory, which has recently been passed (Paauwe, 2020). By the end of 2020, the EU will adopt measures that will increase the transparency of salaries, thereby making it easier to see whether there is a pay gap within companies (European Commission, 2020).

Furthermore, there are also educational programs aimed at girls that stimulate them learning about working in sectors that are not typically female, usually the STEM sectors. These are initiatives such as Girlsday, where girls are invited to companies where they can get to know more technical companies (VHTO, n.d.).

5. Data and Methodology

The research is explorative and large-N, as it focuses on changes inflicted on the Dutch population in the last 15 years by using a representative dataset. The unit of observation and of analysis are the individuals within the sample of the DHS-panel (Dutch Household Survey), whereas the object of analysis is the Dutch population. This is also the relevant population. The DHS is a survey conducted online by CentERdata, a research institute linked to Tilburg University. The data consists of information about mainly economic, financial and personal concepts and characteristics. The DHS data consists of probability-based samples of the Dutch population. The survey poses questions to see how economic and psychological factors influences households' saving behavior. Starting in 1993, 2000 households per year were surveyed through an online survey. The respondents that were chosen for the sample but did not have a computer or internet connection were provided with these. To deal with panel attrition, households that left the panel are replaced by households with similar characteristics. For this study, panel data from 2005-2018 will be used.

Individuals that live in the same households are included in the research. To correct the standard errors because people belong to the same household, cluster robust standard errors will be used in the estimation.

The sample will consist of those that fit the definition of the working labor market population provided by Statistics Netherlands. This group consists of people between 15 and 75 that work more than 12 hours per week. (Dirven & Janssen, 2012; Statistics Netherlands, 2020b). Because those above 67 make up a very small percentage in the dataset (.52%), 67 is included as the maximum working age. Including the self-employed makes a difference of less than .5 percentage point on the uncorrected pay gap and makes no difference in the corrected pay gap. For the sake of parsimony, the self-employed are excluded from the explanatory model. The results are a reflection of those working under a contract in the Netherlands.

After the regression including all control variables, 11,012 of the 11,958 observations are left over. This is likely because these cases had one or more missing variables for the control variables and were thus dropped.

5.1 Relevant Variables

The dependent variable for the research is hourly wage. This variable is calculated using the weekly wage provided by the DHS dataset and multiplying it by 52, to get a yearly number. The weekly wage is the gross pay received by the employer, without any benefits. This number is then divided by the number of hours worked yearly, also provided in the dataset. In the sample, there are 6,416 men and 4,596 women, respectively 58 and 42 per cent. The mean hourly wage before corrections is €22.60 for men and €18.38 for women, meaning there is an uncorrected pay gap of €4.24, which means women earn 18.7% less than men. Variables that are used in this research are that of gender, gross yearly wage and control variables. Control variables can be split between demographic and economic controls. Demographic controls are age, level of education, being a parent, composition of the household, location in country and degree of urbanization. Economic controls are whether an employee works part time or full time, employment in the public or private sector and whether an employee has a temporary or permanent contract.

In tables 1 and 2 the descriptive statistics for the control variables are shown. There are a lot of variables in which men and women are similar, such as education, where men are just overrepresented in lower education, however in middle and higher education the two groups are very similar. Within the demographic control variables, there are less women living together without children and living without a partner. A likely explanation for this is that women with children and with a partner are less likely to belong to the active working labor market population and therefore are not included in these statistics.

For the economic control variables, there are more women with a temporary job and more men with a permanent job. Very obvious is the fact that women work in part time a lot more than men. Furthermore, less women work in the private sector, whereas more work in other sectors. Other sectors are “public limited company, foundation, association, or cooperative society” (CentERdata, 2018).

Table 1. Descriptive statistics of demographic controls

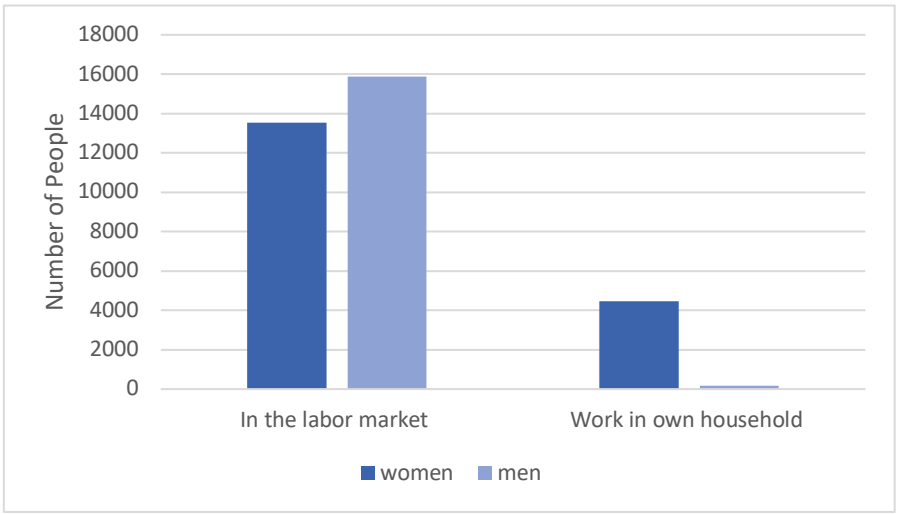
Variable	Men		Women	
Highest level of education completed				
Lower	1486	(23%)	746	(16%)
Middle	2150	(34%)	1676	(36%)
Higher	2743	(43%)	2138	(47%)
Other	37	(1%)	36	(1%)
Parent				
Yes	4,199	(65%)	2,846	(62%)
No	2,217	(35%)	1,750	(38%)
Composition of household				
Living by themselves	1,188	(19%)	955	(21%)
Living together, no children	2,197	(34%)	1,495	(33%)
Living together plus children	2,795	(44%)	1,726	(38%)
Living without a partner	99	(2%)	319	(7%)
Other	137	(2%)	101	(2%)
Region				
Three largest cities	1,043	(16%)	677	(15%)
Other west	1,631	(25%)	1,403	(31%)
North	842	(13%)	544	(12%)
East	1,367	(21%)	980	(21%)
South	1,533	(24%)	992	(22%)
Degree of urbanization				
Very high	1,012	(16%)	718	(16%)
High	1,623	(25%)	1,234	(27%)
Moderate	1,354	(21%)	973	(21%)
Low	1,339	(21%)	982	(21%)
Very low	1,088	(17%)	689	(15%)
Age (mean)	47		44	

Table 2. Descriptive statistic of economic controls

Variable	Men		Women	
Hours worked yearly	1908		1509	
Employment				
Part time	1,184	(18%)	3,122	(68%)
Full time	5,232	(82%)	1,474	(32%)
Contract				
Temporary	383	(6%)	485	(11%)
Permanent	6,033	(94%)	4,111	(89%)
employment in public or private sector				
Public	1,094	(17%)	878	(19%)
Private	3,458	(54%)	1,656	(36%)
Other	1,864	(29%)	2,062	(45%)

In figure 1, the entire sample of the DHS survey is analyzed to see what the main occupation is of the participants. It can clearly be seen that there are more men that have their main occupation on the labor market, whereas more women have their main occupation in the household. This then also explains the previously mentioned statistics of more women living without a partner, as those with a partner are possibly working in their own household.

Figure 1. Main Occupation



5.2 Methodology

To find the extent of the pay gap in the Netherlands, it will be estimated with and without controls. This is done by using an ordinary least-squares linear regression. This method is chosen because it allows both the analysis the pay gap without the interference of control variables, and with control variables, showing how much the control variables influence the pay gap individually (Angrist & Pischke, 2015). The coefficients of the model are estimated using a sample of men and women, as regressors, a constant, gender dummy and year dummy are introduced. The gender dummy is 1 if the individual is female and 0 if the individual is male. The year dummy δ_t is 1 if the year corresponds to t and 0 if otherwise. Furthermore, the gender pay gap is estimated for different age groups and by different levels of education. These formulas will draw inspiration from Fransen et al. (2012) and Blau and Kahn (2017), but made to fit for the research goal of this paper using Angrist & Pischke (2015). First, a wage equation is estimated:

$$y_{it} = \beta_0 + \beta_1 x_i + \delta_t + \varepsilon_{it}. \quad (1)$$

Where y_{it} is the hourly wage in euros for individual i at time t, β_0 is the constant, β_1 is coefficient that captures the pay gap based on gender, x_i is the gender dummy, and ε_{it} is the error term. Lastly, δ_t is the year fixed effect for year t.

Model (1) is extended upon by taking into account demographics and economic factors, resulting in the following equation:

$$y_{it} = \beta_0 + \beta_1 x_i + \beta_2 \vec{z}_{it} + \beta_3 \vec{w}_{it} + \delta_t + \mu_{it}. \quad (2)$$

Where $\vec{z}_{it}$ is the vector of demographic control variables at time t for individual i, measured by β_2. $\vec{w}_{it}$ is the vector with economic control variables, for individual i at time t, measured by β_3. Lastly, μ_{it} captures the error for individual at time t. The same formula will be used for age groups and level of education, where β_1 will be estimated based on these respective groups.

6. Results

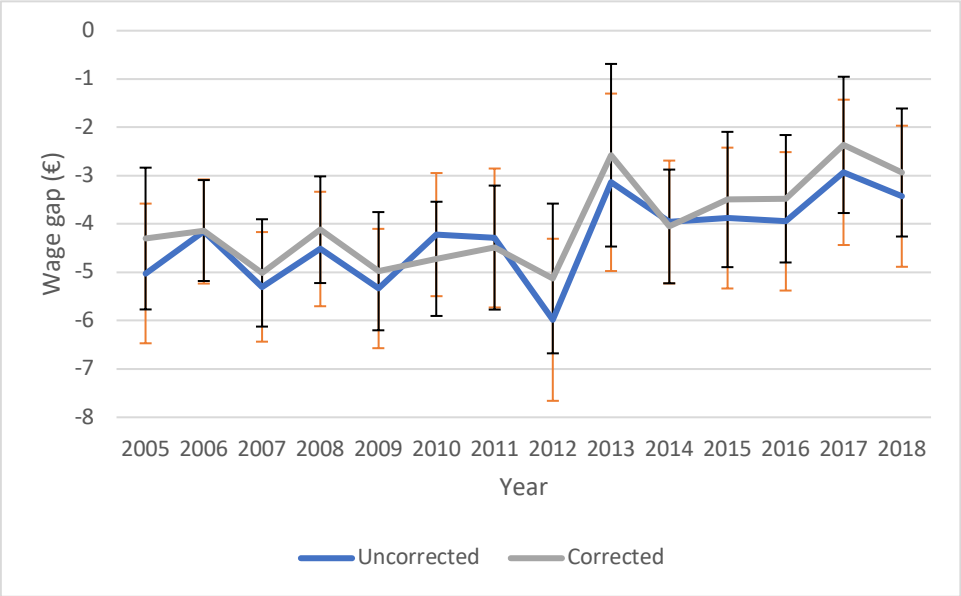
6.1 Gender Pay Gap

The gender pay gap before and after controlling for demographic and economic control variables is displayed graphically in figure 3 and the results can be seen in more detail in table 3. Over the 14 years of this research, there was an average uncontrolled pay gap of 18.52%, where men earned €22.60 and women €18.36. After controls this is 16.23%, where men €21.57 and women €18.07. Both the corrected and uncorrected pay gaps are significant. In Figure 3 it can be seen that there is not a big difference between the corrected and uncorrected line, and the 95% confidence intervals overlap.

Over the last decade, the pay gap has generally decreased. Since 2005 it has decreased by €1.29 per hour, which is a decrease of 28.5%. This is in line with trends provided by Statistics Netherlands, who also have found a decrease in the pay gap in recent years (Portegijs & van den Brakel, 2018). Reasons for this are the greater increase of female wage over these years than male wage: women earned €15.19 in 2005 and €18.25 in 2018, an increase of 20.14%. In the same period men went from earning €20.21 to €21.67, an increase of 7.22%. This is largely due to the fact that the women that started on the labor market had a higher education than those that left the labor market, something that will be explored further in the following sections.

What can be seen in table 3 is that the variables that are part of the economic controls play a big part in determining pay. Especially education has a very large and significant effect. This is in line with the human capital theory, where knowledge is one of the largest influences. Age, however, seems to make quite a small difference. The control factors education and age will be expanded upon in the last sections of the results.

Figure 2. Pay gap with and without controls, 2005-2018



Notes: the 95% confidence intervals are shown by error lines, where the orange lines represent the uncorrected pay gap and black the corrected

Table 3. Results of regression of the wage equation with controls

Variables	Beta	Std. Err.	t-value
Gender			
Man	ref.		
Woman	-4.301	0.783	-5.5***
Function			
Full time	ref.		
Part time	-0.2334534	0.4666722	-0.5
Employment			
On a permanent basis	ref.		
On a temporary basis	-4.955	0.414	-11.980***
Children			
Yes	ref.		

No	-1.949	0.655	-2.970***
Type of employment			
Government	ref.		
Private company	-1.254	0.478	-2.620***
Other	-0.499	0.551	-0.900
Composition of the Household			
Living by themselves	ref.		
Living together, no children at home	-0.162	1.685	-0.180
Living together plus children	0.156	1.707	0.000
Living without a partner, with children	-2.383	0.887	-2.680***
Other	-1.575	1.364	-1.240
Region			
Three largest cities	ref.		
Other west	-1.193	0.777	-1.540
North	-1.897	0.886	-2.140**
East	-1.761	0.821	-2.150**
South	-1.507	0.833	-1.810*
Highest level of education completed			
Special education	ref.		
Kindergarten/primary education	5.302	2.466	2.150**
Pre-vocational education	6.867	1.270	5.410***
Pre-university education	10.093	1.313	7.690***
Senior vocational training	9.068	1.295	7.000***
Vocational colleges	13.830	1.278	10.820***
University education	19.045	1.397	13.630***
Other sort of education/training	13.475	2.047	6.580***

Age	0.162	0.020	8***
Constant	4.806	1.885	2.55**
Number of observatoins	11012		
F	22.17***	(52, 2695)	
R-squared	0.231		

Notes: * significant at the 10%-level, ** significant at the 5%-level, *** significant at the 1%-level

6.2 Control Variables

Of the control variables, there are some that had a significant effect and others that did not. It is interesting to look at those control variables and see what their effects were.

6.2.1 Part time work. There is no significant effect of part time work, as can be seen in table 3. This is curious, as according to theory, those working part time earn less per hour. This could mean a number of things. Women in the Netherlands are much more likely to work part time jobs than men, as was highlighted earlier in the paper and demonstrated in table 2. This means that because women work less hour in general, they receive a lower pay, which should logically explain part of the gap. In the model used for this paper, the effect of part time work is very small and insignificant, thus not explaining any part of the pay gap.

6.2.2 Temporary contract. The variable for temporary contract is significant at the 1% level. The coefficient is -4.96, which means that if one has a temporary contract the hourly wage decreases by €4.96. This makes sense when taking into account human capital factors. Those with a temporary contract have less experience within a company, so they are also likely to earn less money. Furthermore, young people are more likely to have a temporary contract (Pellemans, 2020), and these have, on average, less human capital than older people.

6.2.3 Partner & children. In table 3, it can be seen that there is a significant negative effect at the 1% level of not having children of -1.95, meaning those who do not have children earn €1.95 less per hour. This could be explained by the fact that perhaps people with a more stable financial situation are more inclined to have children. Living without a partner, but with children also has a significant effect at the 1% level of -2.38, meaning that living without a partner results in a lower wage of €2.38. This is logical, as people that are taking care of a child alone are likely to spend more time on taking care of their children, having less time to work in a profession and gain experience or make a promotion. Furthermore, of the couples in which one works and the other takes care of the household, only the working one is included in the sample. Therefore, it is logical that those who have to do both, without being able to share that responsibility, earn less.

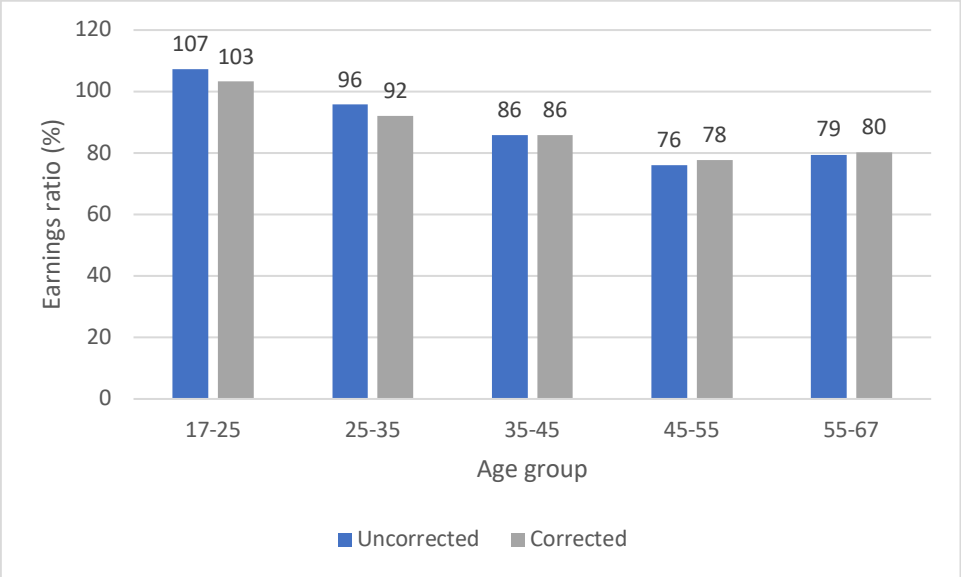
6.2.4 Location. Living in the North, East and South has negative effects on wage. Living in the North has a negative effect of -1.90 at the 5% level, the East -1.76 at the 5% level and the South -1.51 at the 10% level. This means living in the North, East or South

results in a lower wage of, respectively, €1.90, €1.76 and €1.51. This is a known effect and caused by a higher density of companies in the Randstad (the area consisting of the four largest Dutch cities and their surroundings), causing a larger scarcity for many functions and therefore a higher wage (De Volkskrant, 2011).

6.3 Pay Gap by Age and Education

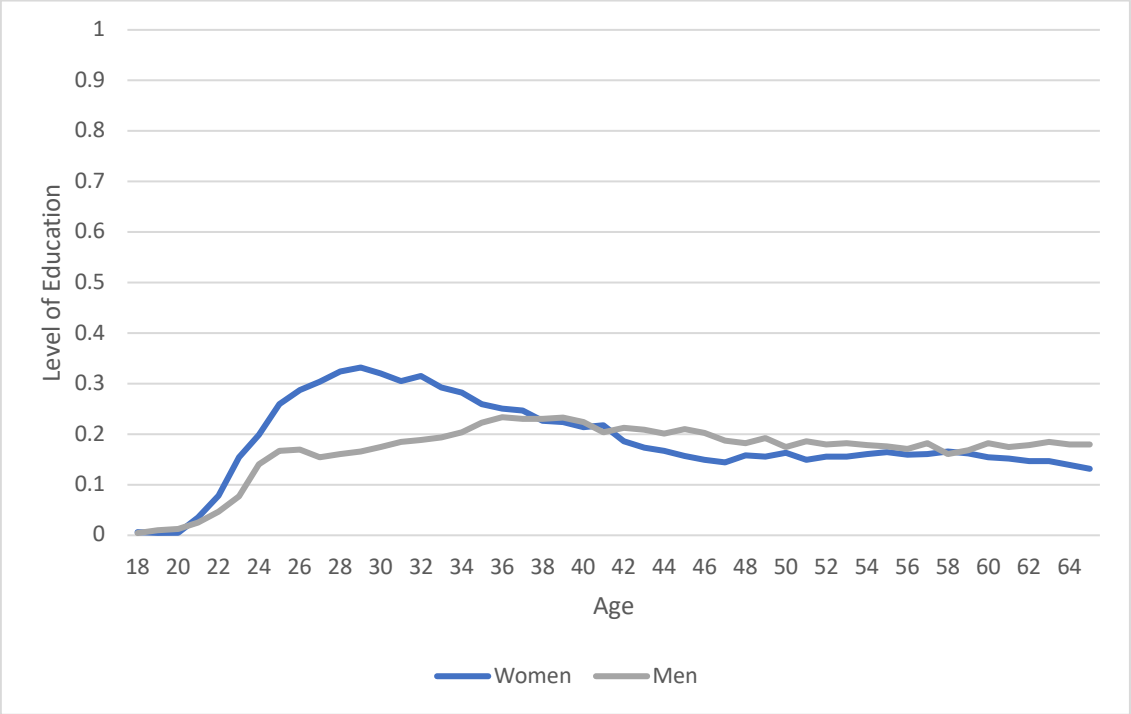
Table 3 shows that age has a rather small, though significant effect on pay of 0.162 at the 1% level. This means that for every year one gets older, wage goes up by 16 cents. Figure 3 shows the earnings ratio of women to men by age group. Before the age of 25, women earn more than men. After 25, however, the pay gap starts growing, increasing until the age of 67. This is in line with developments mentioned earlier in this paper, of young women earning more than men on average. This can be either an age effect or a cohort effect. If it were an age effect, it would mean that this gap would follow the same trend as can be seen in the graph. After a certain age, women will start earning less again, likely because of motherhood and the tendency to work part time after that. If it were a cohort effect, however, this trend of a neutral or positive pay gap in favor of women could persist as this cohort of women grows older. Research by Statistics Netherland concluded that this is a cohort effect (Portegijs & van den Brakel, 2018)

Figure 3. Earnings ratio based on age group for men and women



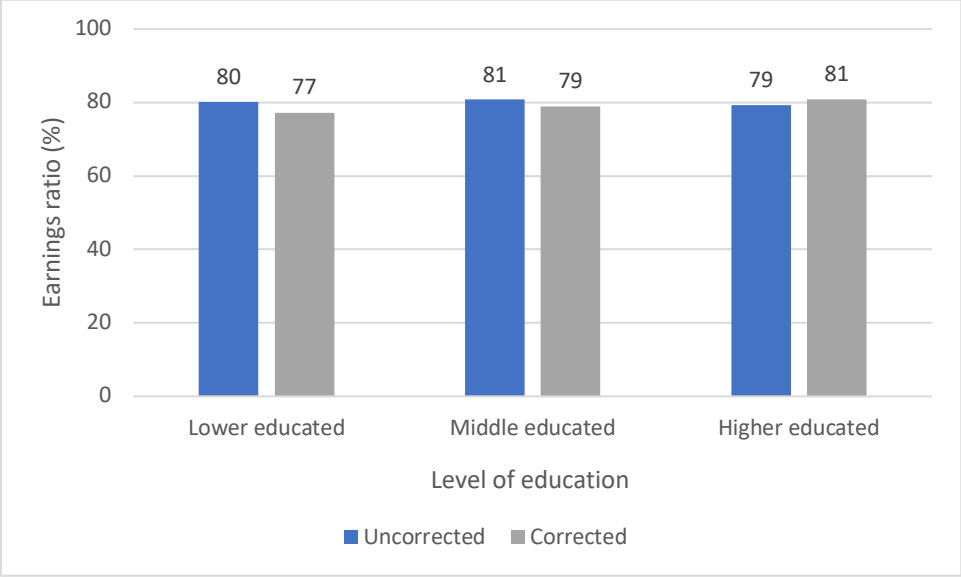
In Figure 4, the average education level of men and women by age is displayed. In the graph, 1 is highly educated, meaning they either went to vocational college or university, and 0 means lower educated, including all other education (Statistics Netherlands, 2008). A clear correlation can be seen between the this figure and figure 3, where in the education level, young women also achieve higher levels than men, which is not the case anymore after about the age of 38.

Figure 4. Education level of men and women by age



In figure 5, the earnings ratio of women by education group is shown. The results are corrected using the same variables as are used in equation 2. Higher educated means someone went to vocational college or university, middle educated means someone went to senior vocational training, or to pre-university education, and lower educated means primary education or pre-vocational education. The correction shows that the pay gap is approximately equal over all groups, higher education even having a larger pay gap than the other two when corrected. This does not mean, however, that women with a higher education do not earn more than those with a middle or lower education. This is the case, as can be seen in table 3. However, women earn less than men with the same education level. The increase of wage for younger women is a trend that goes against this statistic, as women earn more than men. This could also help explain why in recent years the pay gap has decreased, as shown in figure 2. As the education level of women has increased, so have their wages. This is, again, in line with human capital theory.

Figure 5. Earnings ratio based on level of education for men and women



6.4 Glass Ceiling or Sticky Floors

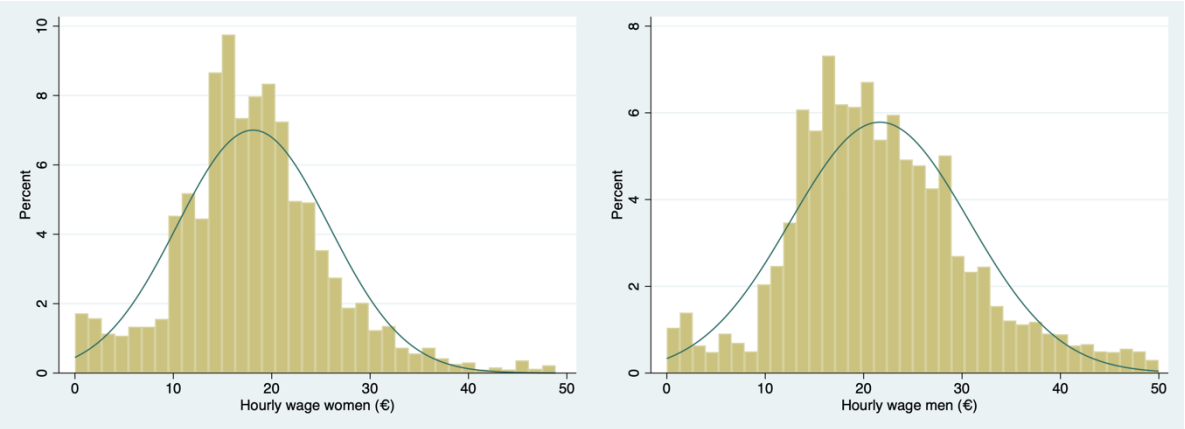
While looking at the mean pay gap is very important and interesting, it is also good to look at how the wages are distributed. Here the theories of glass ceilings and sticky floors are relevant. Where a glass ceiling means that there is a relatively large concentration of men in top positions, whereas women are less concentrated past a certain position. The point where the number of women starts decreasing is then dubbed the glass ceiling, as it implies an invisible point in seniority that women cannot pass. Sticky floors is the phenomenon of women not being able to grow to higher positions, but rather 'sticking' to the floor, staying in lower positions. Ideally, the glass ceiling would be analyzed by looking at the difference between the number of men and women in top positions. However, this information is not available in the DHS data. To still get a sense of the effect in the Netherlands, this section takes the distribution of the wages for men and women as a substitute, assuming that occupations with higher wages are also higher in terms of responsibility, those with the highest wages being top positions.

In table 3, the percentiles of the hourly wages of men and women are shown. In the lower percentiles there is a relatively small difference between men and women. After the 50th percentile this starts increasing much more, showing clear signs of a glass ceiling. The two graphs in figure 7 display the distribution of hourly wages for men and women in the Netherlands. When comparing the two, it is interesting to see if they display signs of a glass ceiling or sticky floor effect for women. There does not seem to be a sticky floor, as there is not an unusually high concentration of women at the bottom of the wage distribution when comparing it to the graph for men, which can also be seen in the percentiles. This is in line with the theory and previous literature, stating that there is not a sticky floor effect in the Netherlands, but there is a glass ceiling (Albrecht et al., 2004).

Table 4. Percentiles of hourly wages for men and women

Percentiles	Men	Women	Difference
1%	1.20	0.96	0.24
5%	6.97	4.81	2.16
10%	11.50	9.40	2.10
25%	15.56	13.74	1.83
50%	20.60	17.74	2.86
75%	26.92	22.19	4.73
90%	33.41	27.47	5.94
95%	38.94	31.85	7.09
99%	47.10	42.28	4.82

Figure 6. Distribution of wages for men and women



7. Discussion

The paper finds a significant pay gap between men and women, that remains significant when when corrected for the variables included in the model. Significant effects on wage are found in the variables mainly associated with human capital, such as education, age and having a temporary contract. Furthermore, effects are found for the location one lives in. Wages are lower in the South, East and North of the country and people that do not have children or single parents also have lower wages.

For age, there is a rather small positive effect as age increases, which is in line with human capital theory, as experience is likely to increase as one gets older. What is more interesting however, is the recent development of young women earning more than young men. These groups are likely to have the same level of experience, so the difference is to be found somewhere else. What the theory suggests, and this paper confirms, is that the reason is that young women have, on average, higher education than young men. This also goes against the statistic found for education levels, where in high levels of education, the same pay gap was found as in lower and middle level of educations. This is not the case for young women, as they earn more. The pay gap between this cohort of men and women might increase again, however, as a large part of these young women become mothers. This is because, due to the norms and values in Dutch society, they are likely to decide to work less. Men are likely to remain working full time. According to Aarntzen et al. (2019), there is one group of women that does not decrease participation based on norms of society, and that is the group of higher educated women that have their baby at a later age in life. It would be interesting for further research to look into whether this might have an effect on the pay gap as the cohort of young women that earn more than men ages.

Whereas education has a very large effect on pay in general, it seems in the grand scheme of things it does not make a lot of difference between the wages for men and women. In figure 3, the results do not show a large difference between the corrected and uncorrected pay gap. A potential explanation is that the wage difference by men and women is determined by other factors than education. The influence of education might be the same for men and women: a highly educated man will earn more than a lower educated man, but not more than a highly educated woman.

The pay gap that is found after controlling for all the variables in the model, might capture the glass ceiling. This phenomenon could not be captured in the model, as the DHS data does not provide information on sectors and position within an organization. This paper attempts to show whether there was a glass ceiling in the Netherlands by using high wages as a proxy for a high position. Using this method, it is found that there are more men earning high wages than women. The reasons for this gap could lie in relatively little experience due to the large number of women working part time, lower levels of education, or discrimination. If the lower level of education would be the cause, in coming years there should be an increase in the number of women in high paid positions, as younger women often have a higher education than men.

Furthermore, when looking at part time work, no real effect is found. This is curious, as theory and the current situation in the Netherlands predicts that those who work part time would earn less money hourly. Furthermore, when looking at human capital factors, it should also have an effect, as those who work part time have less experience than those working full time. This also goes against the personnel economics argument, which argues that there is a punishment for flexibility on the labor market: jobs with a higher pay would then require their employees to be more flexible, which means the jobs that offer part time jobs are those that provide a lower pay.

This paper adds to the literature, as it analyzes the pay gap in more recent years than had been done before in academic literature. Furthermore, it looks at the pay gap, with a large focus on participation. Usually papers do take participation in account as much when looking at the current situation, but this paper explicitly focused on this. Especially in the Dutch case this is relevant, as there is such a large number of women working part time. Moreover, it found evidence of the very recent trend of young women earning more than men because of their higher education levels.

8. Conclusion

Despite having decreased by almost 30 per cent over the last decade, due to increased wages of women, there was still an average (corrected) difference of 15.28% in 2018. This is a decrease from 2005, when the gap was still 22.88%. This paper searches for explanations for the pay gap using theories from literature. The decrease of the pay gap is in line with research done by Statistics Netherlands and shows an alternative to what the research by Intermediair and Nyenrode found, who found an increase in the pay gap. This is likely because Statistics Netherlands uses different methods and has a different sample of the population than the Intermediair report (Ark, 2019; Statistics Netherlands, 2016; Van Muijen & Melse, 2019). A reason for the decrease lies in the fact that younger women have, on average, a higher education. But further explanation might also lie in the policies mentioned before in this paper, stimulating (young) women to work by making day care more attractive, implementing tax breaks and raising awareness about the pay gap and creating projects that aim to increase the labor market participation of women. Furthermore, the increased awareness of the pay gap may have caused certain companies to critically assess their pay structures.

The paper recognizes how intertwined the pay gap and participation are, especially in the Netherlands, where 68% of women work part time compared to 18% of men. Many policies in the Netherlands over the last 14 years were focused on increasing labor market participation. A big influence on the participation of women is motherhood. After motherhood, a lot of women work less or stop working completely. The reason behind this are likely the norms and values in Dutch society, where women in heterosexual relationships are expected to take care of children, and not work more than their partners. But there could also be a factor of discrimination of their employers, who might be willing to invest less in female employees, as women are expected to become mothers and therefore less productive.

The main limitation of this research lies in the fact that no real explanation of the reason for the gender pay gap could be found in the data used. Not all the variables that could be controlled for to explain the pay gap were included. The dataset used did not give insights on the position within an organization a person worked in, meaning the comparable worth theory, stating that people working in a female-dominated industry earn less, could not be

tested. This can make a large difference, because if there is a tendency for women to be more concentrated in a certain position and men in another, this could cause an increase in the part of the pay gap that is explained. Furthermore, the influence of sectors could not be testes, but has been shown to be quite large in the past by Statistics Netherlands (Portegijs & van den Brakel, 2018).

Due to omitted variable bias, what seem like big influences in the model used in this paper, can be smaller in actuality. Whereas it seems that human capital factors have a large influence, they might be smaller when also including other factors. Levels of education have a high level of collinearity in the model, and also a large effect. However, this is not a cause of concern, as the reference category (special education) used in the education variable is rather small, it is logical that there is a high level of multicollinearity. This does not affect anything else in the regression (Allison, 2012). Furthermore, after the regression there were about 900 cases for which one of the variables had a missing value, thus these were not included in the analysis. This could also give a slightly skewed result.

I recommend that an overarching research such as done by Jansen et al. (2016) be conducted for the last decade to identify to what extent there is still discrimination in determining pay. It would be even more interesting if this research could also take into account gender pay discrimination while including ethnicity, which has not been done yet for the Netherlands. Further academic research should also focus on what influence positions and sectors have had on the gender pay gap over the last 15 years in the Netherlands.

Even though the pay gap is shrinking, this does not mean action is not necessary. In recent years, few policies have addressed the pay gap in the Netherlands, and in the past decade all policy was aimed at increasing participation rates rather than decreasing the pay gap directly. Closing the gender pay gap would be a step towards greater gender equality, where gender identity is not one of the factors influencing one's pay. Additionally, closing this pay gap would also be economically beneficial, as it boosts economic growth. (Graven & Krishnan, 2018). A good start is the EU increasing the transparency of pay (European Commission, 2020). However, I would advise the Dutch government to go one step beyond this and take action to directly reduce the pay gap. Following Bjarnadóttir (2020) and the recent proposal by four Dutch political parties (Tweede Kamer der Staten-Generaal, 2019), I would advise the Dutch government to oblige companies to measure their internal pay gap.

Even companies that pay a lot of attention to diversity are often unaware of the pay gap in their organizations. The government can then make it mandatory for companies that have a pay gap to make plans to better themselves. If they fail to complete this plan, fines can be imposed.

Furthermore, the government could analyze the structures that lead to the pay gap, through the increased data on companies they would have after making it obligatory to record their pay gaps. But they could also expand on the informational campaigns they have already set in motion, aimed at the norms and values of many people, decreasing the difference in expectations regarding the amount of time men and women spend on the work floor. Furthermore, the campaign could make people aware of their biases regarding the perception of skills of men and women, taking these away to create a more equal working environment. This could be aimed both at employers, as well as women in general. As was shown by the research of Aarntzen et al. (2019), young parents often take on the values they see in their environment. When campaigns would show alternatives to these norms, perhaps parents would divide care and work tasks more equally.

The government can also look at the factors that have most influence on the (uncorrected) pay gap and change these. It is impossible to change directly human capital factors and doing so through policies takes a long time. Other factors can be influenced directly, such as making it illegal for companies to ask for pay in previous positions and making strict rules about salary negotiations. Doing this would mean that not only those with better negotiating skills get a higher salary, which the Netherlands Institute for Human Rights (2011; 2016; 2018) showed influenced pay to the detriment of women.

9. References

Aarntzen, L., Derks, B., van Steenbergen, E., Ryan, M., & van der Lippe, T. (2019). Work-family guilt as a straightjacket. An interview and diary study on consequences of mothers' work-family guilt. *Journal of Vocational Behavior*, *115*, 103336. https://doi.org/10.1016/j.jvb.2019.103336

Albrecht, J., van Vuuren, A., & Vroman, S. (2004). Decomposing the Gender Wage Gap in the Netherlands with Sample Selection Adjustments. *Tinbergen Institute, Rotterdam and Amsterdam*, 55.

Allison, P. (2012, September 10). When Can You Safely Ignore Multicollinearity? *Statistical Horizons*.

Angrist, J. D., & Pischke, J.-S. (2015). *Mastering 'metrics: The path from cause to effect*. Princeton University Press.

Ark, T. van. (2019, November 27). *Kamervragen van het lid van Weyenberg*. https://www.tweedemonitor.nl/kamervraag/2019D48373

Arulampalam, W., Booth, A. L., & Bryan, M. L. (2007). Is There a Glass Ceiling over Europe? Exploring the Gender Pay Gap across the Wage Distribution. *ILR Review*, *60*(2), 163–186. https://doi.org/10.1177/001979390706000201

Banning, C. (2008, May 22). Ouders zijn blij met nieuwe kinderopvang, het kabinet niet. *NRC Handelsblad*, 19.

Bjarnadóttir, M. (2020, May 7). We're Not Waiting 200 Years to Close the Gender Pay Gap. *Ms. Magazine*. https://msmagazine.com/2020/05/07/were-not-waiting-200-years-to-close-the-gender-pay-gap/

Blau, F. D., & Kahn, L. M. (2001). Understanding International Differences in the Gender Pay Gap. *NBER Working Paper No. 8200*.

Blau, F. D., & Kahn, L. M. (2017). The Gender Wage Gap: Extent, Trends, and Explanations. *Journal of Economic Literature*, *55*(3), 789–865. https://doi.org/10.1257/jel.20160995

Boersema, W. (2018, June 9). Kwart miljard naar kinderopvang. *Trouw*, 11.

Breemer, A. van den, & Frijters, S. (2019, November). *De loonkloof: Waarom vrouwen nog steeds minder verdienen dan mannen*. De Volkskrant.

https://www.volkskrant.nl/kijkverder/v/2019/de-loonkloof-waarom-vrouwen-nog-steeds-minder-verdienen-dan-mannen/

Bussemaker, J. (2013). *Hoofdlijnenbrief Emancipatiebeleid 2013-2016*. Ministerie van Onderwijs, Cultuur en Wetenschap.

CentERdata. (2018). *Codebook DNB Household Survey 2018*. CentERdata.

de Ruijter, J. M. P., Van Doorne-Huiskes, & Schippers. (2003). Size and Causes of the Occupational Gender Wage-gap in the Netherlands. *European Sociological Review*, *19*(4), 345–360. https://doi.org/10.1093/esr/19.4.345

De Volkskrant. (2011, November 15). *Waar in Nederland moet je zijn voor het hoogste loon?* de Volkskrant. https://www.volkskrant.nl/gs-b8a0b5b4

Del Monte, M. (2013). *Application of the principle of equal pay for men and women for equal work of equal value*. European Added Value Unit. https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/504469/IPOL-JOIN_ET(2013)504469_EN.pdf

Dirven, H.-J., & Janssen, B. (2012). *De Nederlandse beroepsbevolking: Twee afbakeningen*. Centraal Bureau voor de Statistiek.

European Commission. (n.d.). *De loonkloof tussen mannen en vrouwen in de Europese Unie*.

European Commission. (2020). *Gender Equality Strategy 2020-2025*. https://ec.europa.eu/info/sites/info/files/aid_development_cooperation_fundamental_rights/gender_equality_strategy_factsheet_en.pdf

Fortin, N. M. (2005). Gender Role Attitudes and the Labour-market Outcomes of Women across OECD Countries. *Oxford Review of Economic Policy*, *21*(3), 416–438. https://doi.org/10.1093/oxrep/gri024

Fransen, E., Plantenga, J., & Vlasblom, J. D. (2012). Why do women still earn less than men? Decomposing the Dutch gender pay gap, 1996–2006. *Applied Economics*, *44*(33), 4343–4354. https://doi.org/10.1080/00036846.2011.589818

Graven, W., & Krishnan, M. (2018). *Het potentieel pakken: De waarde van meer gelijkheid tussen mannen en vrouwen op de Nederlandse arbeidsmarkt* (The Power of Parity). Mckinsey Global Institute. https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Europe/The%20power%20of%20parity%20Advancing%20gender%20equality%20in%20the%20Du

tch%20labor%20market/MGI-Power-of-Parity-Nederland-September-2018-DUTCH.ashx

Jongen, E. (2010). *Child care subsidies revisited* (No. 200). CPB. https://www.cpb.nl/sites/default/files/publicaties/download/child-care-subsidies-revisted.pdf

Jongen, E., Bettendorf, L., & Muller, P. (2011). *Ex post analyse effect kinderopvangtoeslag op arbeidsparticipatie*. CPB. https://www.cpb.nl/sites/default/files/publicaties/download/cpb-notitie-23december2011.pdf

Koot, P., de Boer, H.-W., & Jongen, E. (2018). *Een intertemporele en internationale analyse van de belastingdruk voor paren in Nederland*. 44.

Ministerraad. (2005). *Meerjarenbeleidsplan Emancipatie 2006-2010*. Tweede Kamer der Staten Generaal.

Muller, L., Floris, J., Chkalova, K., Dankmeyer, B., & Bloem, M. (n.d.). Monitor loonverschillen mannen en vrouwen, 2016. *Statistics Netherlands*, 26.

Paauwe, C. (2020, July 2). *Kabinet komt in voorjaar met wetsvoorstel voor vrouwenquotum*. NRC. https://www.nrc.nl/nieuws/2020/02/07/kabinet-komt-in-voorjaar-met-wetsvoorstel-voor-vrouwenquotum-a3989714

Pellemans, J. (2020, April 18). Tijdelijke baan? Reken maar niet op een vast contract. *NRC Handelsblad*, 18.

Plasterk, R. H. A. (2007). *Meer kansen voor vrouwen: Emancipatiebeleid 2008–2011*. Minister van Onderwijs, Cultuur en Wetenschap.

Portegijs, W., Cloïn, M., Ooms, I., & Eggink, E. (2006). *Hoe het werkt met kinderen*. Sociaal en Cultureel Planbureau.

Portegijs, W., & van den Brakel, M. (2018). *Emancipatiemonitor 2018*. CBS & SCP.

Rubery, J., Grimshaw, D., & Figueiredo, H. (2005). How to close the gender pay gap in Europe: Towards the gender mainstreaming of pay policy. *Industrial Relations Journal*, *36*(3), 184–213. https://doi.org/10.1111/j.1468-2338.2005.00353.x

Salm, H. (2006, August 29). Gratis kinderopvang kan de vrouw over de streep helpen; VVD-program. *Trouw*, 10–11.

Statistics Netherlands. (n.d.). *Vrouwen tussen 25 en 30 jaar verdienen per uur meer dan mannen*. Centraal Bureau voor de Statistiek. https://www.cbs.nl/nl-

nl/nieuws/2014/10/vrouwen-tussen-25-en-30-jaar-verdienen-per-uur-meer-dan-mannen

Statistics Netherlands. (2008). *Opleidingsniveau*. Centraal Bureau voor de Statistiek. https://www.cbs.nl/nl-nl/nieuws/2008/16/bijna-evenveel-hoogopgeleide-als-laagopgeleide-nederlanders/opleidingsniveau

Statistics Netherlands. (2016, November 23). *Krijgen mannen en vrouwen gelijk loon voor gelijk werk?*. Centraal Bureau voor de Statistiek. https://www.cbs.nl/nl-nl/nieuws/2016/47/krijgen-mannen-en-vrouwen-gelijk-loon-voor-gelijk-werk-

Statistics Netherlands. (2020a, January 5). *Loonkloof mannen en vrouwen blijft slinken* [Webpagina]. Centraal Bureau voor de Statistiek. https://www.cbs.nl/nl-nl/nieuws/2020/18/loonkloof-mannen-en-vrouwen-blijft-slinken

Statistics Netherlands. (2020b, February 13). *Beroepsbevolking*. Centraal Bureau voor de Statistiek. https://www.cbs.nl/nl-nl/visualisaties/dashboard-beroepsbevolking/beroepsbevolking

The Netherlands Institute for Human Rights. (2011). *Gelijke beloning van mannen en vrouwen bij de algemene ziekenhuizen in Nederland*.

The Netherlands Institute for Human Rights. (2016). *Verdient een man meer? Gelijke beloning van mannen en vrouwen bij hogescholen*.

The Netherlands Institute for Human Rights. (2018). *Gelijke beloning verzekerd? Gelijke beloning van mannen en vrouwen bij verzekeringsorganisaties*.

Tweede Kamer der Staten-Generaal. (2019, March 7). *Voorstel wijziging van de Wet gelijke behandeling*. https://zoek.officielebekendmakingen.nl/kst-35157-3.html

van der Kaaden, A.-M., & Sterk, A. (2018, March 6). Gaat een wet de loonkloof dichten? *NRC Handelsblad*, 6.

Van der Ploeg, P. (2009, March 21). Vechten of puzzelen. *Het Financieele Dagblad*, 23.

van Engelshoven, I. (2018). *Emancipatienota 2018-2021*.

Van Muijen, J., & Melse, E. (2019). *Nationaal Salaris Onderzoek*. Intermediair.

VHTO. (n.d.). *Over Girlsday*. Retrieved June 5, 2020, from https://www.vhto.nl/projecten/girlsday/over-girlsday/

Vos, C. (2008, April 24). Kinderopvang kost overheid geld of aanzien. *De Volkskrant*, 7.

Vos, C. (2011, June 8). Met bezuinigingsbril op, is de kinderopvang in Nederland terug bij af. *De Volkskrant*, 8.

Werk.en.de Toekomst. (2019). *Hoe verkleinen we de loonkloof in Nederland*. Atria. https://www.nederlandsevrouwenraad.nl/docs/Brochure_Hoe_verkleinen_we_de_loonkloof_in_Nederland.pdf

Women Inc. (n.d.). Gelijk Loon Check—Women Inc, hét magazine voor werkgevers. *Women Inc*. Retrieved May 21, 2020, from https://vijftienprocent.nl/magazine/women-inc-zo-werkt-het/gelijk-loon-check/

ZonMw. (n.d.). *Economische zelfstandigheid van vrouwen*. Retrieved May 21, 2020, from https://www.zonmw.nl/nl/onderzoek-resultaten/preventie/programmas/programma-detail/economische-zelfstandigheid-van-vrouwen/

10. Appendix

Table 5. Results of regression of the wage equation with controls

Variables	Beta	Std. Err.	t-value
Gender			
Man	ref.		
Woman	-4.301	0.783	-5.5***
Year			
2005	ref.		
2006	-0.357	0.730	-0.490
2007	0.823	0.753	1.090
2008	0.626	0.748	0.840
2009	1.774	0.768	2.310**
2010	1.964	0.828	2.370**
2011	2.386	0.829	2.880***
2012	3.832	0.856	4.480***
2013	2.842	0.869	3.270***
2014	2.469	0.826	2.990***
2015	2.290	0.806	2.840***
2016	2.772	0.868	3.190***
2017	2.535	0.839	3.020***
2018	1.611	0.859	1.880*
Gender#year			
Woman#2005	ref.		
Woman#2006	0.166	0.795	0.210
Woman#2007	-0.711	0.838	-0.850
Woman#2008	0.183	0.866	0.210
Woman#2009	-0.675	0.895	-0.750

Woman#2010	-0.420	0.943	-0.450
Woman#2011	-0.187	0.941	-0.200
Woman#2012	-0.826	1.048	-0.790
Woman#2013	1.724	1.199	1.440
Woman#2014	0.250	0.941	0.270
Woman#2015	0.808	1.025	0.790
Woman#2016	0.823	0.997	0.830
Woman#2017	1.938	1.019	1.900*
Woman#2018	1.367	0.979	1.400
Parent			
Yes	ref.		
No	-1.947	0.655	-2.970***
Employment			
On a permanent basis	ref.		
On a temporary basis	-4.955	0.414	-11.980***
Type of employment			
Government	ref.		
Private company	-1.254	0.478	-2.620***
Other	-0.499	0.551	-0.900
Degree of urbanization			
Very high	ref.		
High	0.142	0.730	0.200
Moderate	0.605	0.730	0.830
Low	0.304	0.793	0.380
Very low	-0.136	0.758	-0.180
Composition of the Household			

Living by themselves	ref.		
Living together, no children at home	-0.312	1.685	-0.180
Living together plus children	0.008	1.707	0.000
Living without a partner, with			
Children	-2.381	0.887	-2.680***
Other	-1.694	1.364	-1.240
Region			
Three largest cities	ref.		
Other west	-1.193	0.777	-1.540
North	-1.897	0.886	-2.140**
East	-1.761	0.821	-2.150**
South	-1.507	0.833	-1.810*
Highest level of education completed			
Special education	ref.		
Kindergarten/primary education	5.302	2.466	2.150**
Pre-vocational education	6.867	1.270	5.410***
Pre-university education	10.093	1.313	7.690***
Senior vocational training	9.068	1.295	7.000***
Vocational colleges	13.830	1.278	10.820***
University education	19.045	1.397	13.630***
Other sort of education/training	13.475	2.047	6.580***
Function			
Full time	ref.		
Part time	-0.2334534	0.4666722	-0.5
Age	0.1620189	0.0202588	8***
Constant	4.811915	1.886233	2.55**
Number of observations	11012		

F	22.17***	(52, 2695)
R-squared	0.231	

Notes: * significant at the 10%-level, ** significant at the 5%-level, *** significant at the 1%-level

Table 6. Results of uncorrected regression wage gap

Year	Uncorrected Beta	SE	T-values
2005	-4.976	0.726	-6.860***
2006	-4.192	0.766	-5.470***
2007	-5.613	0.768	-7.310***
2008	-4.517	0.800	-5.650***
2009	-5.259	0.823	-6.390***
2010	-4.040	0.821	-4.920***
2011	-4.384	0.875	-5.010***
2012	-6.057	0.852	-7.110***
2013	-3.233	0.840	-3.850***
2014	-3.953	0.728	-5.430***
2015	-3.184	0.737	-4.320***
2016	-3.958	0.731	-5.420***
2017	-2.878	0.703	-4.090***
2018	-3.419	0.729	-4.690***
Number of obs	11,958		
F	25.29***	(27, 11930)	
R-squared	0.054		
Adj R-squared	0.052		

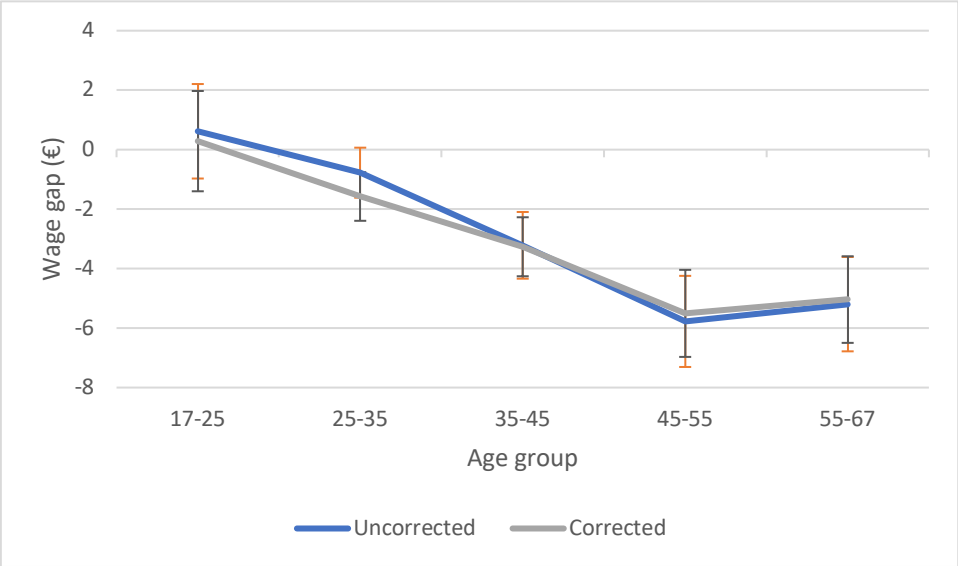
Notes: * significant at the 10%-level, ** significant at the 5%-level, *** significant at the 1%-level

Table 7. Results of corrected regression wage gap

Year	Corrected Beta	SE	T-values
2005	-4.584	0.728	-6.300***
2006	-4.553	0.758	-6.010***
2007	-5.660	0.753	-7.520***
2008	-4.483	0.787	-5.700***
2009	-5.403	0.820	-6.590***
2010	-5.043	0.801	-6.300***
2011	-4.929	0.832	-5.930***
2012	-5.482	0.813	-6.740***
2013	-2.919	0.810	-3.600***
2014	-4.382	0.703	-6.240***
2015	-3.065	0.699	-4.390***
2016	-3.805	0.688	-5.530***
2017	-2.540	0.674	-3.770***
2018	-3.279	0.690	-4.750***
Number of obs.	11056		
F	58.91***	(53, 11002)	
R-squared	0.221		
Adj R-squared	0.217		

Notes: * significant at the 10%-level, ** significant at the 5%-level, *** significant at the 1%-level

Figure 7.



Notes: the 95% confidence intervals are shown by error lines, where the orange lines represent the uncorrected wage gap and black the corrected

Table 8. Results of uncorrected regression of wage gap by education level

Uncorrected	Beta	Std. Err.	t-value	95% Conf. Interval	
Higher educated	-3.655084	0.6626468	-5.52***	-4.954387	-2.355781
Middle educated	-3.829416	0.5720276	-6.69***	-4.951035	-2.707798
Lower educated	-5.582085	0.6411306	-8.71***	-6.8392	-4.324971

Notes: * significant at the 10%-level, ** significant at the 5%-level, *** significant at the 1%-level

Table 8. Results of corrected regression of wage gap by education level

Corrected	Beta	Std. Err.	t-value	95% Conf. Interval	
Higher educated	-3.335672	0.6677219	-5***	-4.644971	-2.026374
Middle educated	-3.58952	0.5435844	-6.6***	-4.655405	-2.523636
Lower educated	-4.457507	0.6359055	-7.01***	-5.704419	-3.210595

Notes: * significant at the 10%-level, ** significant at the 5%-level, *** significant at the 1%-level

Table 9. Results of corrected regression of wage gap by age group

Corrected	Beta	Std. Err.	t-value	95% Conf. Interval	
17-25	0.286049	0.8598234	0.33	-1.400	1.972
25-35	-1.575725	0.4165435	-3.78***	-2.393	-0.759
35-45	-3.265465	0.5058151	-6.46***	-4.257	-2.274
45-55	-5.505226	0.7464247	-7.38***	-6.969	-4.042
55-67	-5.041119	0.7424715	-6.79***	-6.497	-3.585

Notes: * significant at the 10%-level, ** significant at the 5%-level, *** significant at the 1%-level

Table 10. Results of uncorrected regression of wage gap by age group

Uncorrected	Beta	Std. Err.	t-value	95% Conf. Interval	
17-25	0.6176575	0.8101209	0.76	-0.971	2.206
25-35	-0.7745756	0.4288695	-1.81*	-1.615	0.066
35-45	-3.217123	0.5718177	-5.63***	-4.338	-2.096
45-55	-5.775605	0.7813031	-7.39***	-7.308	-4.244
55-67	-5.195542	0.8088498	-6.42***	-6.782	-3.610

Notes: * significant at the 10%-level, ** significant at the 5%-level, *** significant at the 1%-level

Table 11. Variance inflation factor test

Variable	VIF	1/VIF
Gender	13.7	0.073015
Year		
2006	3.01	0.332314
2007	3.05	0.327561
2008	2.94	0.33963
2009	2.83	0.353277
2010	2.9	0.345407
2011	2.82	0.35488
2012	2.86	0.349976
2013	2.87	0.347965
2014	3.3	0.30295
2015	3.29	0.304181
2016	3.36	0.297514
2017	3.41	0.292924
2018	3.36	0.297346
Gender#year		
Woman#2006	3.06	0.32678
Woman#2007	3.19	0.313533
Woman#2008	3.04	0.328619
Woman#2009	2.89	0.346556
Woman#2010	2.96	0.337564
Woman#2011	2.88	0.346709
Woman#2012	2.9	0.344416
Woman#2013	2.96	0.337509
Woman#2014	3.56	0.281005
Woman#2015	3.5	0.285425
Woman#2016	3.63	0.275744

Woman#2017	3.67	0.272138
Woman#2018	3.62	0.27596
Children		
No	2.42	0.413292
Employment		
on a temporary basis	1.08	0.923817
Type of employment		
Private company	2.08	0.481247
Other	1.97	0.507098
Degree of urbanization		
high degree of urbanization	2.88	0.347476
moderate degree of urbanization	2.95	0.339342
low degree of urbanization	3	0.333244
very low degree of urbanization	2.77	0.361172
Composition of the Household		
living together, no children at home	2.01	0.496936
living together plus children	3.56	0.280678
living without a partner, with children	1.37	0.730119
Other	1.15	0.867863
Region		
other west	2.83	0.353372
North	2.25	0.444388
East	2.95	0.339134
South	3.04	0.329112
Highest level of education completed		
kindergarten/primary education	5.86	0.170586

pre-vocational education	61.43	0.01628
pre-university education	33.86	0.02953
senior vocational training	76.54	0.013064
vocational colleges	82.48	0.012124
university education	52.81	0.018937
other sort of education/training	3.62	0.276241
Function		
Part time	1.47	0.681362
Age	1.78	0.563081
Mean VIF	8.73	