

The Gender Wage Gap in the Netherlands from 1986 to 2012: a Multilevel Analysis

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ABSTRACT

The decreasing Dutch gender earnings differential remains substantial, suggesting evidence for gender discrimination. Using biannual Labor Supply Panel data from 1986 to 2012, this study explores the extent and trend of the Dutch gender wage gap as well as the relative importance of explanations for that size and trend from human capital, job/firm, individual/household and national/contextual characteristics. The results show that job/firm and human capital characteristics partially explain the significant Dutch gender wage gap in 2012, but that none of the theories considered explains the decline of this gender wage gap from roughly 20% in 1986 to 9% in 2012.

Keywords

Gender wage gap, gender pay gap, gender earnings differential, gender discrimination, gender inequality

INTRODUCTION

The goal of this research is to describe the income difference between men and women in the Netherlands, to explore and describe the trend of this difference over the period from 1986 to 2012 and to find explanatory factors for the difference itself as well as its trend over time. More specifically, this study aims to find answers to the following four questions. First, which differences exist between the wages of men and women? Second, which theories influence these differences? Third, what is the trend in the differences between the wages between men and women? Fourth and final, which factors explain this trend?

The scientific contribution of this study to the existing knowledge of the Dutch gender wage gap¹ is fourfold. First, this study aims to find the relative importance of four theories in terms of the extent to which they are able to explain the gender wage gap. Second, this study aims to determine the extent to which the theoretical factors able to explain the size of the Dutch gender wage gap are also able to explain its trend over time. Third, this study uses multilevel growth models to take into account the hierarchical structure of the Labor Supply Panel data, whereas other multilevel studies have not used the same dataset or did not have the same goal of analyzing the (trend of the) gender wage gap [9][10]. Fourth and final,

¹ The gender wage gap is defined as “the difference between the average gross hourly earnings of men and women expressed as a percentage of the average gross hourly earnings of men” [12].

² Each of these models were split further in parts A, B and

the period under analysis of the Labor Supply Panel data in this study (1986-2012) is substantially larger than the periods studied previously using the same data (1986-1988 and 1994-1998) [26].

According to previous studies, the Dutch gender wage gap seems to have been decreasing over the past years from 19% in 2002 to 16% in 2014 and is no longer higher than the average gender wage gap of all European Union countries [12]. However, a substantial gender wage gap remains in the Netherlands [11]. Even when controlling for explanatory factors, there seems to remain an unexplainable part of the gender wage gap of about 8 to 15%, which is usually labeled as gender discrimination [1][13][20]. Since gender discrimination contrasts with the Law on Equal Treatment of Men and Women [28] and harms economic growth and the supply of quality jobs [11], it is essential to research the causes of the gender wage gap and its trend over time to allow policy makers and institutions to establish efficient measures to further decrease the gender wage gap in favor of equality and a prospective economy [11].

THEORETICAL FRAMEWORK

The theoretical explanations for the existence and trend of the gender wage gap have been grouped in four overarching clusters, which will be addressed separately.

Human Capital Theory

A first possible explanation of the gender wage gap is given by *human capital theory*. This view assigns gender wage differentials to differences in productivity characteristics and skills between men and women, such as education level, field of study and work experience [5][6]. International as well as Dutch research has shown that women earn less than men because they are generally lower educated than men [16][25] but that female educational attainment has increased during the past decades [8][10][13][19]. Furthermore, women receive lower wages because they generally choose certain fields of study (e.g. humanities) that yield lower wages in the future [6][9][10][17], but they more often tend to choose higher-paying fields of study (e.g. technology) anno 2012 than in previous decades [21]. Finally, women earn less than men because they generally accumulate less work experience during their participation in the labor market [4][8][10][11][25], although women tend to gain more job experience anno 2012 than previously [13][19]. Summarizing these previous findings, the first hypothesis can be formulated as follows. *Hypothesis 1: Human capital characteristics significantly explain the gender wage gap as well as its decline over time.*

Job and Firm Characteristics

The gender wage gap can also be explained by *job/firm characteristics*, such as occupation level, sector, working hours, labor status and firm size. Researchers have found that worldwide as well as in the Netherlands, women earn less than men because their work is undervalued [4][11][25] and they are segregated in lower-level occupations [10][13][25]. Also, this kind of vertical segregation has been roughly stable over the past decades [7]. Moreover, women are segregated in certain female-dominated sectors that yield lower wages [13]. However, this type of horizontal segregation has reduced over the past three decades [7]. Furthermore, research has shown that women earn less than men because they generally work fewer hours than men [7], but that women have increased their number of working hours relative to men during the past decades [1]. Additionally, women earn less than men because they are less likely than men to be self-employed, yielding lower wages for women [15]. However, self-employment rates have increased for men as well as women during the past decades [20]. Finally, women receive lower wages than men because they generally work in smaller firms paying lower wages [13][25][26] but the proportion of females has increased over the past decades [14]. Summing up these previous findings leads to the second hypothesis. *Hypothesis 2: Job/firm characteristics significantly explain the gender wage gap. Of these characteristics, only sector, working hours and firm size significantly explain its decline over time.*

Individual and Household Characteristics

According to Becker's *discrimination theory*, employers have preferences regarding children, age, gender, marital status and other such individual/household characteristics when hiring employees [5]. Both international and Dutch research has indicated that women earn less than men because they generally are younger than men during their participation in the labor market and their earnings reach a plateau earlier than men's earnings [3][26], and that retirement ages for both men and women have increased over the past decades [24]. Furthermore, while women experience a marriage/cohabitation penalty and men receive a marriage/cohabitation premium [27], young individuals tend to cohabit or marry less often and/or at a higher age anno 2012 than previously [23]. Finally, women generally specialize in childcare and men in the labor market [6][8][20], which seems to have been enforced over the past two to three decades because the average female fertility rate has increased [22]. Consequently, the third hypothesis is formulated as follows. *Hypothesis 3: Individual and household characteristics significantly explain the gender wage gap. Of these characteristics, only marital status significantly explains its decline over time.*

National Contextual Characteristics

The distribution of wage among men and women is also affected by *the overall wage inequality* in terms of the national wage structure, pay systems and unemployment [13][20]. Countries with a more compressed wage structure and small wage dispersion usually have a smaller gender wage gap [8]. As high unemployment

relates to low wage inequality, a more compressed wage structure, more job supply and lower overall wages, high unemployment is expected to be associated with a low gender wage gap [8]. Finally, the unemployment rate in the Netherlands between 1986 and 2012 shows a net decrease from about 9.5% to 6.5%, suggesting an increase of the gender wage gap during that same period of time. This leads to the fourth hypothesis. *Hypothesis 4: The gender wage gap is smaller in years when overall national unemployment rates are high than when unemployment rates are low. As the declined national unemployment rate suggests an increase of the Dutch gender wage gap over the past two decades, the national unemployment rate significantly explains the gender wage gap but not its decline over time.*

Overarching Hypotheses

Changes in the explanatory variables of each of the four theories are expected to cause the gender wage gap to increase or decrease over time. Despite these factor-level differences, the expectation is that the net effect of all these factors together results in a decrease of the gender wage gap over time, as suggested by previous research [16][19]. However, the relative importance of the four theories considered in this study for explaining the gender wage gap as well as its trend over time cannot be formulated in the hypotheses as this is not deductible from literature. This leads to the overarching hypothesis of this study, split into four sub-hypotheses:

Hypothesis 5.a: There exists a significant gender wage gap in the Netherlands anno 2012.

Hypothesis 5.b: The significant gender wage gap that exists in the Netherlands in 2012 can be partially explained by human capital characteristics, job/firm characteristics, individual characteristics and the national unemployment rate.

Hypothesis 5.c: The Dutch gender wage gap has significantly declined from 1986 to 2012.

Hypothesis 5.d: The decline of the Dutch gender can be partially explained by changes in human capital characteristics, job/firm characteristics, individual characteristics and the national unemployment rate.

DATA, OPERATIONALIZATION AND METHODOLOGY

Data

The data that has been used for this study is the biannual data from the Dutch Labor Supply Panel from 1986 to 2012 [18]. This is a longitudinal labor market panel survey that is being held biyearly among 4500-5000 individuals between the ages of 16 and 66 inclusive and is conducted multiple times under the same respondents. The Labor Supply Panel includes quantitative information about work, education, age, work experience, job tenure, firm size and other personal and work-related characteristics.

Operationalization

All variables have been operationalized, made equivalent throughout the years and selected according to labor market criteria. This resulted in interval variables for log net monthly wage, time, work experience, working hours, firm size, age, number of children and unemployment rate and categorical dummy variables for gender, education

level, field of study, occupation level, sector, labor status and marital status.

Methodology

Multilevel growth models have been formulated to take into account that the panel waves (i.e. years) are clustered within individuals. Random intercept and slopes models with linear, quadratic and cubic time variables as fixed effects and main effects and interaction effects with time for gender have been formulated according to the four theories. Model 0 contains no additional variables; Model 1 additionally contains human capital variables; Model 2 contains job/firm characteristics; Model 3 contains individual/household characteristics; Model 4 includes national/contextual factors and Model 5 the total of all factors from the four theories.²

RESULTS

The findings in Table 1 show that according to the significant and negative main effect of gender in the most accurate model (i.e. Model 5 that includes the total of all variables), a significant adjusted gender wage gap exists anno 2012 and has a magnitude of 9.4%. Therefore, the results provisionally satisfy Hypothesis 5.a: a significant gender wage gap exists in the Netherlands in 2012.

Table 1

	Multilevel Regression Results											
	Model 0: Gender	Model 1: Human Capital	Model 2: Job and Firm	Model 2A: Job and Firm (Decrease)	Model 2B: Job and Firm (Increase)	Model 2C: Job and Firm (Steady)	Model 3: Individual and Household	Model 3A: Individual and Household (Decrease)	Model 3B: Individual and Household (Increase)	Model 4: National Context	Model 5: Total	
	h (CI)		h (CI)		h (CI)		h (CI)		h (CI)		h (CI)	
(Constant)	6.820*** (6.797, 6.844)	6.887*** (6.863, 6.912)	6.681*** (6.658, 6.704)	6.687*** (6.663, 6.711)	6.815*** (6.791, 6.838)	6.835*** (6.812, 6.858)	6.878*** (6.854, 6.902)	6.822*** (6.799, 6.846)	6.879*** (6.855, 6.902)	6.831*** (6.807, 6.855)	6.764*** (6.741, 6.788)	
Gender												
Female	-503*** (-530,- 475)	-447** (-473,- 421)	-281*** (-303,- 258)	-291*** (-316,- 267)	-501*** (-528,- 474)	-495*** (-521,- 470)	-484*** (-511,- 457)	-502*** (-530,- 475)	-484*** (-511,- 457)	-503*** (-531,- 476)	-221*** (-242,- 200)	
Female- Interaction with time	.003*** (.001, .005)	.002** (.0004, .003)	.005*** (.003, .006)	.004*** (.003, .005)	.003*** (.002, .005)	.003*** (.002, .005)	.003*** (.001, .004)	.003*** (.001, .005)	.003*** (.001, .004)	.003*** (.001, .005)	.004*** (.003, .005)	
χ^2 (df) of likelihood ratio test with Model 5	9.938.572 (30)**	7.851.006 (19)**	2.198.644 (15)**	4.019.390 (20)**	9.731.032 (28)**	8.418.126 (27)**	9.563.716 (27)**	9.937.069 (29)**	9.564.128 (28)**	9.915.857 (29)**	-	
Gender wage gap in 1986 (%)	39.529***	36.046***	24.497***	25.248***	39.408***	39.043***	38.369***	39.468***	38.369***	39.529***	19.828***	
Gender wage gap in 2012 (%)	31.717***	30.840**	11.465***	14.828***	31.596***	31.231***	30.557**	31.656***	30.557**	31.717***	9.408***	
Explained part of gender wage gap (Model 0) (%)	-	8.811***	38.027***	36.126***	.306	1.229	2.934	.153	2.934	.000	49.838***	

Note (significance levels): * p<0.1; ** p<0.5; *** p<0.01
Source: Labor Supply Panel 1986-2012 (Netherlands Institute for Social Research (SCP)); own calculations

Moreover, the differences between the main effect of the female dummy of Model 0 and the main effects of the female dummy of Models 5, 2, 2A and 1, respectively, are significant. This suggests that a significant part of the unadjusted gender wage gap can be explained by the total of all characteristics from all four theories, the total of all job/firm characteristics, the job/firm characteristics expected to cause a decrease of the gender wage gap over time and human capital characteristics, from strongest to weakest explanatory ability. Contrastingly, neither individual and household characteristics nor national contextual characteristics are able to significantly explain the gender wage gap. Therefore, the results partially refute Hypothesis 5.b: the gender wage gap in the Netherlands can be explained by two of the four theories considered, namely job/firm characteristics and human

capital characteristics, as well as the combination of all four theories, but not by individual and household characteristics or national contextual characteristics.

The significant and positive interaction effects of gender with time in models 0 and 5 indicate that the unadjusted gender wage gap has declined from 39.5% in 1986 to 31.7% in 2012 and that the adjusted gender wage gap has roughly halved from 19.8% in 2012 to 9.4% in 2012. The results therefore provisionally confirm Hypothesis 5.c: the Dutch gender wage gap has significantly declined from 1986 to 2012. However, none of the theories considered in this study is able to significantly explain the decline of the gender wage gap over time as shown by the non-significant differences between the coefficient of the interaction effect of the female dummy in Model 0 and the coefficients of the interaction effects of the female dummy in the other models. Therefore, the results contradict Hypothesis 5.d: changes in the factors of none of the theories considered are able to explain the decrease of the Dutch gender wage gap from 1986 to 2012.

CONCLUSION

The results regarding the size of the corrected, adjusted gender wage gap correspond to the findings of previous research [1][13][20] and could be the result of other unobserved factors, such as gender and racial discrimination in the labor market. Moreover, the results regarding the decline of the gender wage gap agree with findings from international research but simultaneously refute the findings of a steady unadjusted Dutch gender wage gap of about 20% [26], possibly because the other study analyzed a shorter period of time. Furthermore, the results regarding the explanations of the magnitude of the gender wage gap partially refute the findings from literature, because this study found that job/firm and human capital characteristics indeed partially explain the gender wage gap, but that national contextual and individual and household characteristics are not able to explain the gender wage gap. Finally, our results have shown that contrary to the expectations from previous research, the factors in none of these four theories are able to significantly explain the decline of the gender wage gap over time.

A first limitation of this study is that sample selection, which is an issue due to the high proportion of part-time working females, has not been accounted for. Second, this study could have included variables that indicate the proportion of females in a certain occupation or sector in order to test the effect of segregation and female crowding. In the future, it would be interesting to research whether the gender wage gap varies across the wage distribution. Furthermore, it would be valuable to extend this study to different countries to explore the effects of macro level factors such as culture, policies and norms.

In short, this study suggests that in order to further decrease the Dutch gender wage gap, governments and companies must look beyond changes in human capital, job/firm characteristics, individual/household factors and unemployment rates. Rather, the recommendation is to look into policies that help reduce gender discrimination

and overall wage inequality [8][13][19], such as solidaristic wage policies, favorable work-family policies, extended childcare, favorable tax and transfer systems, education policies and non-discrimination policies.

ROLE OF THE STUDENT

Florianne Verkroost was an undergraduate student of the BSc Technology and Liberal Arts and Sciences at the University of Twente. She proposed this topic herself and polished her plans together with her supervisors Prof. Dr. A. Need, Prof. Dr. Ir. B.P. Veldkamp and Dr. G. Jansen, and she received the grade of a 10 for her thesis. The design and planning of the research, the literature study, the programming, the data operationalization, the quantitative analyses, the processing of the results, the formulation of the conclusions, the discussion of the study and its limitations and implications and all the writing were done by the student.

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