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THE FINANCIAL CRISIS 2008-2009 AND ECONOMIC GENDER EQUALITY IN SWEDEN

Bachelor Thesis NEKH01
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ABSTRACT

The purpose of my thesis is to examine if the financial crisis 2008-2009 effects economic gender equality in Sweden during (2008-2009) and after (2010-2015) the crisis and if so, how. The purpose is also to analyse if the outcomes are consistent with Gary S. Becker's theoretical framework the taste discrimination model and the division of labour model.

I define economic gender equality by using the variables wage, permanent employment, temporary employment, unemployment and temporary paternal benefits. Wage, temporary employment, permanent employment and unemployment represents the labour market and paid labour. Temporary paternal benefits represent unpaid labour.

The analysis is conducted using a Difference in Difference (DiD) estimation approach using panel-data from Statistics Sweden and the Swedish Social Insurance Agency on all 21 Swedish counties during the time-period 2005-2015.

Key findings, assuming that wage is the final outcome on the labour market, are that Becker's taste discrimination model can be confirmed based on the wage DiD-outcomes during the crisis. However, it can be rejected when analysing the change in wage in proportion to the change in employment. After the crisis, the taste discrimination model can be rejected regardless of how the DiD-outcomes are interpreted. I claim that wage in proportion to employment is a better indicator of economic gender equality and conclude that labour market and paid labour gender equality decrease in both time-periods. Becker's division of labour model can also be rejected as unpaid labour (temporary paternal benefits) gender equality decrease during and after the crisis regardless of the relative changes on the labour market and in paid labour. As labour market and paid labour and unpaid labour gender equality decrease during and after the crisis, the overall conclusion is that economic gender equality decrease as an effect of the crisis.

Keywords: Sweden, economic gender equality, the financial crisis, taste discrimination, the division of labour

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1. Introduction

According to the World Bank, gender equality contributes to increased productivity and has a large impact on GDP. It is therefore an important subject to address not least from a general economic point of view (World Bank, 2012). Walby (2009) and the European Commission (2013) describes recessions in general and the financial crisis 2008-2009 in specific as gendered, that is, it affected men and women differently (Walby, 2009; The European Commission, 2013). The crisis did not only affect the financial markets but had its core and the following consequences in the real economies, the economy and lives of ordinary citizens and households. Reports from around the world shows that the first effects of the crisis are decreased gender gaps in wage and unemployment rates. The European Commission (2013) states that the reason is men being worse off not women being better off (The European Commission, 2013). There is also an almost unanimous view that gender equalities have decreased and gender gaps have increased after the crisis (see for example Rubery & Rafferty, 2013; Nyberg, 2014).

Although Sweden has managed to get through the crisis without too harsh repercussions, the market shock caused by the crisis led to a significant increase in unemployment and a deteriorating labour market. According to Gary S. Becker's taste discrimination model, market shocks leads to an increased competition which in turn leads to an increase in wage gender equality. When women's position on the labour market is strengthened and female relative wages increase, Becker's division of labour model expects that the division of paid and unpaid labour within households change. If the models are compatible with the Swedish crisis context, the financial crisis 2008-2009 may lead to increased economic gender equality in Sweden.

There are many articles and reports from different perspectives conducted on how the financial crisis has affected gender equality. However, there is a lack of scientific articles based on the subject using Sweden as a casestudy. The purpose of my thesis is to examine if the financial crisis 2008-2009 effects economic gender equality in Sweden during (2008-2009) and after (2010-2015) the crisis and if so, how. The purpose is also to analyse if the outcomes are consistent with Becker's theoretical frameworks the taste discrimination model and the division of labour model.

2. Background

2.1 The financial crisis 2008-2009 and the Swedish context

Most European economies were heavily affected by the financial crisis 2008-2009 with large impact on public finances leading to large budget deficits and debts. Sweden was initially also hit hard. Swedish GDP fell by five percent (above average in the EU), exports fell by 16 percentage points and unemployment increased rapidly during the peak of the crisis 2008-2009. (Anxo, 2011). The following and miraculously fast Swedish recovery has been a case of international interest. Anxo (Anxo in Lehndorff, 2012) and Bergman (2011) highlights the importance of lessons learned from the 1990's crisis as crucial for the Swedish resilience during the 2008-2009 crisis. Expansionary fiscal and monetary policy, a fall in the Swedish krona and a relative low increase in wage rates slowing down labour costs boosted Swedish exports. In 2011, Swedish exports were back to pre-crisis levels. (Bergman, 2011). The small change in unemployment rate compared to the GDP fall, well allocated reforms¹, continuously inflow of tax revenues and a decreased outflow of government funds resulted in relatively strong public finances, a budget surplus and a government debt ratio around 40 percent of GDP (Anxo in Lehndorff, 2012; Bergman, 2011). After the peak of the crisis 2008-2009 household disposable income and private consumption increased. By 2011 the Swedish GDP had grown by 5.7 percent and the high unemployment rates had started to decline (Anxo in Lehndorff, 2012).

Even though Swedish unemployment rates have been low in comparison to the fall in GDP, a deteriorating labour market with high unemployment is one of the worst effects of the crisis. Unemployment rates increased dramatically starting from the fourth quarter 2007. 2008 the unemployment rate was 5.7 percent. It peaked at 8.8 percent in the fourth quarter 2009. The rates decreased during 2010 and by 2011 it was down to 7.3 percent. Female unemployment rates have been relatively less affected than male unemployment rates as employments in male-dominated export-oriented manufacturing industries was first affected by the market shock (Bergman 2011). Another explanation is that Swedish deficits and the need for fiscal consolidation was limited during the crisis and restrictive fiscal policy in the female-dominated public sector was sparse. (Anxo in Lehndorff, 2012). Ongoing budget cuts in the public sector had also already reduced public sector employments.

¹ Such as reduced unemployment insurance, lowered benefits and reforms in sickness insurance.

Employment rates have followed the unemployment rate trends. From the first quarter 2008 to the fourth quarter 2009 employment decreased by three percentage points. Even if employment levels were back to a 2008 level in 2011 (at 75 percent), the employment levels were lower than the 2007 levels. (Bergman 2011).

2.2 Economic gender equality

According to the Swedish government, Sweden is well known for its long traditions of highlighting and strengthening gender equality by a well-developed and well-functioning welfare system that encourage men and women to actively and equally participate in the labour market. Swedish labour market policies are influential and supported by state provided child care which is crucial for equal labour market participation. Gender equality is further reinforced by gender mainstreaming. The concept implies that all policies should include a gender perspective as a strategy to achieve the equality objects desired (Proposition 2014/15:1).

In an index developed by the European Institute for Gender Equality on behalf of the European Commission 2015 (based on 2012 data), Sweden ranks first in the EU on gender equality and fourth in the global gender gap index and the gender equality index. The indexes are based on categories such as money, time, health, power and work. Sweden is considered a role model when it comes to gender equality (OECD, 2015). However, Nyberg (2014) points out that the high Swedish rankings are linked to an average low gender equality in the rest of the world. Sweden scores high on political representation but lacks gender equality development in other areas such as the labour market. (Nyberg, 2014). Women generally have a higher education than men and work longer hours than before but gender wage gap has not changed in proportion to those changes. Women earn 13% less than men (2011) which is one point below the OECD average. Furthermore, women are in greater extent unemployed, work part-time, take out most of the parental leave and temporary parental benefits and do more unpaid labour. (OECD, 2015; Nyberg, 2014).

Gender gap in the Swedish labour market is partly due to gender segregation. Swedish labour market gender segregation declined during 2008-2013 but the gender composition on the labour market is still uneven. (Swedish National Mediation office, 2015). Women are overrepresented in sectors such as health, education and social work. Men only account for 11

percent of the workforce in those sectors. Men have not broken into traditional female-dominated occupations, although women have, to a small extent, broken into male-dominated occupations. The share of women in female-dominated sectors have decreased and the share of women in male-dominated sectors have increased leading to a decreased labour market segregation during 2008-2013. (European Parliament policy department, 2015). Still, according to the Swedish National Mediation Office dissimilarity index, 55.1 percent of all women would have had to change occupation in order to obtain a gender neutral occupation allocation in 2013. The numbers are an improvement from 2008 when 57.3 percent of all women would have had to change occupation for the same cause. (Swedish National Mediation office, 2015). Even though the trend is positive, Swedish gender segregation on the labour market is still notable large. For example, only one-fourth of all computer science graduates are women. Women are also underrepresented in higher positions on the labour market. In 2010, 31 percent of senior management position were occupied by women and in 2009, 19 percent of all company board positions were held by women (OECD, 2015).

2.3 Defining Economic Gender Equality

Gender equality is a useful concept that can be applied and altered depending on the context for which it is intended. I will adopt the definition of economic gender equality to the Swedish context and to the premise of my thesis.

Economic gender equality is described in the Swedish government proposal (2014) on economic gender equality as men's and women's equal opportunity regarding education, paid labour and economic independence during the whole life cycle including retirement. It includes equal working conditions such as wage, employment and development opportunities on the labour market. Economic gender equality also requires conditions generating equality on the labour market, such as equal division of unpaid labour. (Proposition 2014/15:1). Unpaid labour can be defined as time input assigned to activities parted from the labour market, performed to aid and provide for the needs of the household (Swiebel, 1999).

Based on the definition from the Swedish government proposal, I define economic gender equality by using the variables wage, permanent employment, temporary employment, unemployment and temporary paternal benefits. Wage, temporary employment, permanent employment and unemployment represents the labour market and paid labour. Temporary

paternal benefits represent unpaid labour. A short description of the variables and why they are important for the purpose of my thesis is in hand.

2.3.1 Unemployment

The unemployment rate reflects gender labour market segregation and potential discrimination on the labour market. Unemployment affects men and women differently. Men are generally worse affected by recessions as they work in sectors that are sensitive to economical cycles. Gender gaps in unemployment has since the 1990's been steady at 3-5 percent. (Proposition 2014/15:1).

2.3.2 Wage

The relative individual wage within households affects the power to influence household decisions and is related to individual well-being. In 2015 female wages were equivalent to 87 percent of male wages. It equals a 13 percent wage gap and a 4 400 SEK monthly difference. The wage gap is partially explained by education, age, work position, working hours and sector. That taken into account leaves the unexplained differences in wage which may be due to discrimination or factors like personal characteristics that are hard to measure. Gender wage gaps are decreasing. Since 1995, female wage has increased by 77 percent vis-à-vis male wage that has increased by 50 percent. It is partially explained by women working longer hours than before. (Proposition 2016/17:1).

2.3.3 Temporary Employment and Permanent Employment

Studies on labour market gender equality traditionally use part-time and full-time employment to analyse gender gaps in labour market participation. As data on part-time and full-time employment is not available at county-level I use temporary and permanent employment instead. The use of temporary and permanent employment does not reflect male and female time allocation on the labour market as part-time and full-time employment does. It does instead reflect the possible difference in labour market attachment which is equally as interesting from a gender point of view.

Temporary employment contributes to economic insecurity due to its fixed duration nature and may be considered as a bad type of employment as many employers use temporary employments instead of permanent employments. Temporary employment includes hourly bait, temporary posts, project work and call contracts. Two-thirds of those temporary

employed would like a permanent employment. In 2010 the proportion of women holding temporary employments was 54 percent, mostly due to different use of temporary employment in different sectors. (Statistics Sweden, 2015). The job satisfaction amongst temporary employed depend on the form of temporary employment. Call contracts are considered as bad whereas project work are considered as good. (Holmlund & Storre, 2002). Accounting for all temporary employments, men hold 14.6 percent of the call contract employments and 11.9 percent of the project work employments. Women hold 18 percent of the call contract employments and 7.6 percent of the project work employments. (Swedish Statistics, 2015).

From 2000-2007 the numbers of temporary employed increased by 19 percent with record high figures in 2007. During the crisis the number of temporary employed decreased by 14 percent and increased again after the crisis. Many cutbacks in employments during the crisis were made in temporary employments. In 2014 the numbers were roughly the same as in 2007. (Statistics Sweden, 2015).

2.3.4 Temporary Parental Benefits

As data on unpaid labour on county-level is unavailable, temporary paternal benefits represents unpaid labour in my thesis. Temporary paternal benefits are used to refrain from work to care for a sick child up to 12-15 years of age (Försäkringskassan.se). The advantages of using temporary paternal benefits to represent unpaid labour are that household decision on temporary paternal benefits can change over night as overall microeconomic and household conditions change². In addition, it can not be postponed to evenings or weekends and has an instant impact on paid labour and wage. For that reasons it is a good indicator of the division of paid and unpaid labour. But for the same reason it may interfere with general interpretations of unpaid labour. Additionally, the division of unpaid work and the division of temporary paternal benefits may differ. Furthermore, not all households include children in the age span 0-15 years and the use of temporary paternal benefits representing unpaid labour will exclude several households.

According to Stanfors (2014) there is a struggle between the labour markets and family life as women do more unpaid labour. The relative high numbers of women in the labour market hides traditional differences when it comes to unpaid household labour. Women often work part-time and are absent from work to care for children. It affects women's carriers, incomes,

² As suppose to using parental leaves for which decisions are made once per child.

pensions and health negatively (Stanfors, 2014). Gender gaps in unpaid labour has improved but women did 56 percent of all unpaid labour 2010/2011 as suppose to 60 percent 1990/1991.

3. Theoretical Framework

There is a wide range of literature aiming to explain equality and discrimination, ranging from biological to cultural aspects. Many theories take a structural stance stating that individuals create social structures and help to reinforce unattractive discriminating structures. Economic models of discrimination originate from Nobel prize winner Gary S. Becker's book *The Economics of Discrimination*³. I will use two of Becker's models, the taste discrimination model and the division of labour model as theoretical frameworks in my thesis, jointly helping to interpret my outcomes.

3.1 Becker's taste discrimination model

Becker's taste discrimination model was the first theoretical bridge connecting social science and economic theory and has been the frontier of many economic and social science fusions. The essence of the model is the distinction of the channels affecting discriminatory behaviour with respect to wage and employment segregation. Becker's defines wage discrimination as different wage paid to workers that are perfect substitutes but differ in terms of gender, race, religion, social class or other non-monetary factors. The model implies that when markets are free and competitive and enforced by property rights, market forces eliminate ineffective discrimination leading to equal wage for equal work. Becker use the term "taste for discrimination" when explaining how firms prefer to hire some workers and not others. (Andrén 2012).

Given the context of my thesis, a firm with a taste for discrimination has a discrimination coefficient (d) and gets disutility from employing women. To maximize utility, the firm sums the profits and the monetary value correlated with employing men and women:

$$U = pF(N_m + N_w) - \omega_m N_m - \omega_w N_w - dN_w$$

³ The Economics of Discrimination was first published 1957.

U is utility, p is the price level, F is the production function, N_m is male workers, N_w is female workers, ω_m is male wage and ω_w is female wage.

A firm with prejudice against women has a discrimination coefficient larger than zero ($d > 0$). For those firms, female wage is perceived as larger than male wage ($\omega_w + d$). Prejudice firms will hire women only if:

$$\omega_m - \omega_w \geq d$$

In a market with several firms, $C(d)$ denotes the cumulative distribution function of the discrimination coefficient (d). Each firm hires an optimal number of workers so that the marginal revenue product equals the wage:

$$\begin{aligned} pF'(N_m) &= \omega_m \\ pF'(N_w) &= \omega_w + d \end{aligned}$$

$pF'(N_m)$ is the marginal revenue product for male workers, $pF'(N_w)$ is the marginal revenue product for female workers. Assuming that p is fixed and valid for all firms in the market, the demand for men and women is:

$$\begin{aligned} N_m^d(\omega_m, \omega_w, C(d)) \\ N_w^d(\omega_m, \omega_w, C(d)) \end{aligned}$$

Which gives wage:

$$\begin{aligned} N_m^d(\omega_m, \omega_w, C(d)) &= N_m^s(\omega_m) \\ N_w^d(\omega_m, \omega_w, C(d)) &= N_w^s(\omega_w) \end{aligned}$$

$N_w^s(\omega_w)$ is the supply function for women and $N_m^s(\omega_m)$ is the supply function for men. Wages differ, such that $\omega_w < \omega_m$, if the number of discriminating employments are larger than the demand for women and $w_w = w_m$ is less than the supply. If the number of non-discriminating firms are large enough, competition will drive discriminating firms of the market. (Laing, 2011; Autor 2009).

Measuring discrimination is hard. There are no direct measurements and it requires isolating discrimination from other differences such as education, experience and personal characteristics, all hard to measure. (Chiswick, 1995).

Arrows and Phelps criticized the taste discrimination model using the words “*Becker’s model predicts the absence of the phenomenon it was designed to explain*” (Arrow, 1972:192), referring to the free market working to reduce discrimination. The model is limiting as the market is restricted by unions, reforms, quotations and policies some aiming to improve gender equality. Becker has not taken that into consideration. (Arrow, 1972).

Measuring economic gender equality requires a theoretical framework that not only takes an economic, but also a social science stance as discrimination is to be perceived as based on social structures that undervalues female skills compared to male skills. The taste discrimination model takes both stances into account. Given that reason, it is interesting to analyse the financial crisis using the taste discrimination model. The model will be used when analysing the variables representing the labour market and paid labour - wage, temporary employment, permanent employment and unemployment.

3.2 Becker’s division of labour model

The division of labour model considers the household as a unite firm with two rational workers, a man and a woman. The division of labour within the firm is based on personal comparative

production advantages were the household divide paid and unpaid labour to maximize a joint utility. (Becker, 1993). This first version of Becker’s division of labour model has been criticised as comparative advantage can be interpreted as, that women should only do unpaid labour and men should only do paid labour. (Andrén, 2012). Becker’s renewed division of labour model assumes that individuals are equal workers with individual utility and that unpaid and paid labour is divided using negotiations in line with non-cooperative game theory. Bargaining power is based on human capital and individual resources such as education, labour market participation and wage that gives economic advantages. If economic advantages are unequal, bargaining power and the distribution of labour will also be unequal.

The economically stronger worker will do more paid labour and the economically weaker worker will do more unpaid labour. If the division of labour is highly unequal, the economically weaker worker will lose connection to the labour market giving an extra disadvantage. (Becker, 1993; Andrén, 2012).

The division of labour model assumes that a recession will only slightly affect lifetime incomes and for that reason does not affect the distribution of labour within the household. The model assumes that the reduced level of consumption experienced during recessions are more likely to be compensated with less savings or loans. (Andrén, 2012). Starr (2010) rejects the division of labour model assumptions and claims that the recession 2008-2009 did have an effect on the division of labour (in the US) as the consequences of the crisis are perceived as long-term (Starr, 2010). If Starr's assumptions are right, there is reason to analyse the financial crisis using the division of labour model.

The division of labour model connects decisions on paid and unpaid labour within the household to gender equality on the labour market. The same connection is central in my definition of economic gender equality and the model is for that reason a good theoretical framework when analysing my outcomes from the variable representing unpaid labour – temporary paternal benefits.

3.3 Previous research

According to the European Commission's synthesis report (2013) on how the financial crisis has affected gender equality in the European Union, the financial crisis 2008-2009 is gendered, that is, it affected men and women differently. The report indicates that gender gaps have declined but that it is not automatically the same as improved gender equality but more likely an effect of men and women being differently affected by the crisis. The general initial crisis effects on gender equality in westernized countries are decreased gender gaps in wage and unemployment. Karamessini's (2014) comparative case study on 9 westernized countries⁴ shows that it is due to a worsening situation for men not an improved situation for women. (Karamessini, 2014) There is also an almost unanimous view that gender gaps have worsened after the crisis. It is confirmed in Rubery and Rafferty's (2013) study on the crisis effect on gender equality in the UK that concludes that gender gaps decreased at the beginning of the

⁴ Greece, Hungary, Iceland, Ireland, Italy, Portugal, Spain, UK and the US

crisis 2008 but increased in 2009-2010. It shows that the effects of the crisis are spread in different stages for men and women. Research by Nyberg (2014) shows the same results in Swedish context analysing the 1990's recession and the financial crisis 2008-2009 (Nyberg, 2014). The European Commission (2013) also finds that just as male unemployment rates are first, worse and relatively rapidly hit by the crisis, male unemployment rates also recover faster than female unemployment rates (The European Commission, 2013).

Results from studies on the financial crisis 2008-2009 indicate that gender equalities have worsened. It contradicts the results presented by Black & Strahan (2001) and Black & Brainerd (1999), both confirming Becker's taste discrimination model. Black & Brainerd (1999) concludes that an increase in trade and thus an increase in competition generates decreased wage gaps (Black & Brainerd, 1999). The same results are found by Black & Strahan (2001) when analysing deregulations in the bank industry. Black & Strahan (2001) finds that the average wage for male banking employees fell after the deregulation, illustrating that bonuses were shared with men more than with women pre-deregulations. (Black & Strahan, 2001) Similar conclusions can be drawn from The European Commissions synthesis report on the 2008-2009 crisis that concludes that female relative wages increase during the crisis partially due to missed out bonuses normally paid out to men to a higher extent than to women. (The European Commission, 2013). It should be noted that the context analysed by Black & Brainerd (1999) and Black & Strahan (2001) differ from the context of the financial crisis 2008-2009 as their conclusions are based on generally positive changes. However, the possible overall implications of market shocks leading to an increased gender equality may be considered as the same.

All previous mentioned research indicates that market shocks affects the composition of men and women on the labour market. According to an article by Holmlund & Storre (2002) on temporary employment in turbulent times⁵ temporary employment rates increase during recessions. (Holmlund & Storre, 2002). Examining good and bad temporary employments⁶ shows that bad temporary employments increase more. Short-term temporary employment increase to cover for the loss of permanent employment. Temporary employments during recessions also have a wage penalty correlating with reservation wage adjustments when

⁵ referring to the 1990's crisis in Sweden (Holmlund & Storre, 2002)

⁶ See section 2.3.3 (Temporary and permanent employment) for definition.

unemployment is high. (Holmlund & Storre, 2002). This can be interpreted as movement from permanent employment to unemployment and short-term temporary employment with wage penalties and that temporary employments during recessions may be interpreted as bad temporary employments. As men and women are differently affected by unemployment during the crisis, the movement may affect men and women differently.

Note that overall temporary employments in Sweden actually decreased during the crisis 2008-2009. The change is in part due to stricter laws regulating temporary employments introduced in July 2007 but also because many employment cutbacks were temporary employments. (Statistics Sweden, 2015). The changed terms of temporary employment may nevertheless still be true when applied to the crisis 2008-2009.

If market shocks affect the composition of men and women on the labour market, it may also affect the division of paid and unpaid labour in the household. The European Commissions (2013) finds that services directed to replace unpaid labour has decreased during the crisis. (The European Commission, 2013). It suggests that more unpaid labour is divided within the household. A number of articles indicate that market shocks and recessions affect gender roles and the division of unpaid and paid labour negatively for women. Leschke & Jepsen (2012) concludes that traditional gender roles, expecting women to do unpaid labour, are enhanced during times of crisis (Leschke & Jepsen, 2012). Similar results are found by Aguiar, Hurst & Karabarbounis (2011) who examine the financial crisis and time allocation during the time-period 2009-2010. They find that male paid labour time-allocation decline by more than female paid labour time-allocation at the same time as men and women allocate the same amount of lost paid working hours to unpaid labour (Aguiar, Hurst & Karabarbounis, 2011). It adds up to women spending relatively more time on labour in total. Hartmann, English & Hayes (2010) also concludes that unemployment doubled female time spent on caregiving but only slightly changed the time spent on caregiving for males.

Previous research on the division of labour during recessions can be compared to Brines (1994), Greenstein (2002) and Bertrand, Kamenica & Pan's (2013) findings on the division of labour when female wage increase, not necessarily caused by a market shock. As women earn more, men do more household labour. But the equalizing effect only holds up to the point where male and female wages are equal. If women earn more, the social aspects of division of labour takes over. Brines (1994) findings implies that a relatively higher female wages intrude

on gender roles as men traditionally earn more than women. To neutralize the earning inequalities women do more unpaid labour. (Brines, 1994)

4. Methodology

4.1 The Difference in Difference estimation approach

To capture the exogenous variation followed by the crisis it is appropriate to use the Difference in Difference estimation approach. Difference in Difference (DiD) is a technique used when analysing the effects of quasi-experiments, also known as natural experiments. The DiD-estimate observes two groups over two time-periods distinguished by a sharp change or treatment that affects the treatment group in the second time-period but does not affect the control group in any time-period. The treatment and control groups may not necessarily be equal at baseline and the different outcomes after controlling for a variable (Y) may in fact be differences at baseline. Instead of simply controlling for the outcome in Y, it is better to control for the difference in outcome to overcome the baseline differences. It means controlling for the change over the time-period between the control and the treatment group.

Assume that $Y^{treatment_before}$ is the sample average in the treatment group before the experiment and $Y^{treatment_after}$ is the sample average in the treatment group after the experiment. Similarly, $Y^{control_before}$ is the sample average in the control group before the experiment and $Y^{control_after}$ is the sample average in the control group after the experiment. The average change in each group is $Y^{treatment_after} - Y^{treatment_before}$ and $Y^{control_after} - Y^{control_before}$. The DiD-estimator is the difference in average change between the treatment and the control group after the crisis with respect to before the crisis:

$$\beta^{DiD} = (Y^{treatment_after} - Y^{treatment_before}) - (Y^{control_after} - Y^{control_before})$$

$$\beta^{DiD} = \Delta Y^{treatment} - \Delta Y^{control}$$

The remaining DiD-estimator is unbiased and consistent in describing the causal effect. (Stock & Watson, 2015).

To use a DiD estimation approach the data must meet certain criteria's. The parallel trend assumption assumes that if the treatment, in this case the financial crisis, did not occur, the

difference between the treatment and control groups would be constant over time. The trends before the crisis should be similar although allowing for different levels of trends. This is the most crucial - but also the hardest criteria to fulfil and can be controlled by a visual inspection of the data in graphs. (Stock & Watson, 2015).

4.2 Fixed effects

Using fixed effects (FE) controls for time-constant factors that may be unobservable and may have an impact on the outcome. The assumption is that unobservable individual effects correlate with the independent variable. By using fixed effects, the unobservable individual effects are removed by demeaning the data. In my thesis, it means controlling for variations across all 21 counties and the variation in each county over the time-period 2005-2015⁷.

4.3 Frequency weighting

Frequency weighting is used to make the sample representative for the population in the sample (Solon, Haider & Wooldridge, 2013). I use data aggregated at county-level. To ensure that the sample is representative, and that small counties do not drive my results, I weight the counties by population.

5. Data

I use panel-data originating from Statistics Sweden and the Swedish Social Insurance Agency that range over the time-period 2005-2015. I chose the time-period as all variables are available during 2005-2015. It is also a good range of years to see the initial effects of the crisis. The population is all 21 Swedish counties equivalent to the whole of Sweden. It generates 231 observations per variable.

5.1 Assigning treatment and control groups

I base the assigning of treatment and control group on unemployment rates as change in unemployment is one of the largest effects of the crisis in Sweden. It also shows the impact of the crisis in both the private and the public sector. The 21 counties are ranked from 1-21 according to how bad they are affected during the peak of the crisis from the third semester

⁷ That is, controlling for county and year fixed effects.

2008 to the third semester 2009⁸. County 11 is excluded to further increase the distance between the treatment and the control group. County 1-10 are above the median affected by the crisis and are assigned as treatment group. County 12-21 are below the median affected by the crisis and assigned as control group. (See Table 6 in Appendix). In my DiD regression-models it gives the treatment dummy variable *Treat*, $Treat = 1$ if the observation is for the treatment group and $Treat = 0$ if the observation is for the control group.

Observing initial graphs of the variables I notice that the trend in the treatment and control group differ somewhat more after the crisis (2010-2015) than during the crisis (2008-2009). It may indicate different recovery rates in the treatment and control group. For that reason, it is interesting to study the DiD effects during and after the crisis with respect to before the crisis. In the DiD regression-models it gives a year dummy variable divided into three time periods. $Year = 0$ if the observation is before the crisis, $Year = 1$ if the observation is for during the crisis (2008-2009) and $Year = 2$ if the observation is for after the crisis (2010-2015).

⁸ The assignment using unemployment rates is based on an article by Tillväxtanalys (2013).

5.2 Variables

Table 1: Variables used in the regression-models

Variable	Definition of raw data
Dependent variable	
Unemployment (Unem)	Unemployment (age 15-74) in thousands by county, gender and year (2005-2015).
Wage (Wage)	The total wage for residential municipality (night time population) in million SEK, according to supervisory registry by county, gender, and year (2005-2015).
Employment	Employed (age 15-74) in thousands by county related to the degree of labour, gender and year (2005-2015).
- Temporary employment (Tem)	
- Permanent employment (Perm)	
Temporary paternal benefits (Pat)	Temporary parental benefits, care of children in number of (net) days distributed by county, gender and year (2005-2015).
Independent variable	
DiD-interaction variables	Based on year and county dummies. $treat_c \times during_t$ and $treat_c \times after_t$.
Control variable	
Regional Gross Domestic Product (GRP)	Regional Gross Domestic Product per capita in current prices SEK in thousands ⁹ by county and year (2005-2015).
Variables used in equations	
Population (Pop)	Population residential in thousands by county and year (2005-2015) ¹⁰ .
Worker	Employed (age 15-74) in thousands by county, gender and year (2005-2015).

The dependent variable, also known as the outcome variable, is the variable (Var) to be explained by the independent variables in a regression (Stock & Watson, 2015). The dependent variables in my DiD-regressions are wage, temporary employment, permanent employment, unemployment and temporary paternal benefits. All variables are individually tested.

⁹ Figures for 2015 are preliminary.

¹⁰ Not specified by gender.

The independent variable, also known as the predictor measures the effects of the dependent variable. (Stock & Watson, 2015). The independent variables in my DiD-regressions is the DiD-interaction variables based on year and county dummies $treat_c \times during_t$ and $treat_c \times after_t$.

Control variables are variables other than the independent variables that may affect the outcome. Including controls shows if the estimates are sensitive to the inclusion of that variable and if there is omitted variable bias. (Stock & Watson, 2015). The DiD-design itself controls for omitted variable bias and including control variables are thus not generally necessary. However, DiD do not control for trends that change during the treatment. Controlling for such trends increase the precision of the estimate. In my case, GRP may vary across counties during the treatment and is for that matter included in the models.

I use three measures of economic gender equality in my thesis. The nominal difference (VarNom) measures the nominal difference between men and women per capita (Equation 1). The nominal difference in wage (WageNom) is measured per worker (Equation 2).

Equation 1: The equation for VarNom

$$\frac{Var^{women}}{\frac{Pop}{2}} - \frac{Var^{men}}{\frac{Pop}{2}}$$

Equation 2: The equation for WageNom

$$\frac{Wage^{women}}{Worker^{women}} - \frac{Wage^{men}}{Worker^{men}}$$

The percentage difference (VarPer) measures the relative difference between men and women per capita in percent (Equation 3). The relative difference in wage (WagePer) is measured per worker (equation 4).

Equation 3: The equation for VarPer

$$\left(\frac{\frac{Var^{women}}{\frac{Pop}{2}} - \frac{Var^{men}}{\frac{Pop}{2}}}{\frac{Var^{women}}{\frac{Pop}{2}}} \right) 100$$

Equation 4: The equation for WagePer

$$\left(\frac{\frac{Wage^{women}}{Worker^{women}} - \frac{Wage^{men}}{Worker^{men}}}{\frac{Wage^{women}}{Worker^{women}}} \right) 100$$

The absolute squared deviation (VarSq), measures gender equality (equation 5). If the outcome is 0, it is fully equal. The higher the numbers, the lower the equality.

Equation 5: The equation for VarSq

$$\left(\frac{Var^{women}}{\frac{Pop}{2}} - \frac{Var^{men}}{\frac{Pop}{2}} \right)^2$$

Equation 6: The equation for WageSq

$$\left(\frac{Wage^{women}}{Worker^{women}} - \frac{Wage^{men}}{Worker^{men}} \right)^2$$

Note that the VarSq outcomes are not comparable with other variable's VarSq outcomes as the outcomes only correspond to the data of the specific variable. The VarSq outcomes in figures will not be emphasised in the analysis, but rather what the outcomes indicate in terms of gender equality.

5.3 Validity

All data is collected from Statistics Sweden and the Swedish Social Insurance Agency. The data is not part of a complete dataset and have been collected to fit the premise and purpose of my thesis. It is important to mention the disadvantages linked to the use of data not constructed for the purpose of a specific experiment. The modification may cause defaults in calculations and give skewed results. (Eliasson, 2013).

I have used wage for county night time population and workers by county in the same equation (equation 2, 4 and 6). Workers employed in a county may not correspond to wage for the night time population in a county as some wage earners may work in, and get paid from other counties. Furthermore, workers do not include self-employed workers but wage does. The same argument goes when using temporary and permanent employment and

population in the same equation (equation 1, 3 and 5). Those employed in a county may not correspond to the residual population in the same county.

Furthermore, using temporary paternal benefits representing unpaid labour may not measure unpaid labour to a full extent¹¹. The analysis of the link between the labour market and paid labour and unpaid labour should therefore be interpreted with caution.

6. Results

6.1 Statistical interpretation

The statistical interpretation will be presented first generally for all variables, then separately and more in detail for each variable.

I use four DiD-regression models for each of the five variables and the three equations (VarNom, VarPer and VarSq) to test how the control variable GRP and the county and year fixed effects change the outcomes. It gives a total of 12 DiD-regressions models. Model 1 includes the DiD-interaction variables. All other models are based on model 1 and include: GRP in model 2, county and year fixed effects in model 3 and GRP and county and fixed effects in model 4. The base specification is:

$$Y_{ct} = \beta^d \text{treat}_c \times \text{during}_t + \beta^a \text{treat}_c \times \text{after}_t + X_{ct}\beta + \lambda_c + \psi_t + \varepsilon_{ct}$$

Where $\text{treat}_c \times \text{during}_t$ is the DiD-estimate during the crisis, $\text{treat}_c \times \text{after}_t$ is the DiD-estimate after the crisis, X_{ct} is the control variable GRP that varies by both county and time. λ_c and ψ_t are county and year fixed effects¹² and β^d and β^a are coefficients for the DiD-estimates.

When not including frequency weighting counties by population in the regression models, almost all coefficients are non-significant. When including frequency weighting, almost all

¹¹ See section 2.3.4 (Temporary paternal benefits)

¹² In the specifications without fixed effects, I include the dummies treat_c , during_t and after_t instead. All regressions included in the text are weighted by county population. Regressions not weighted by county population are found in table 7 in the Appendix.

coefficients are significant (see table 2-6 below). The change (some change qualitatively) are probably due to the fact that all counties are weighted correctly. (See table 7 in Appendix). The following analysis is based on models including frequency weighting counties by population.

Table 2-6 shows that including GRP in model 2 has large effects on some VarNom coefficients, worst for WageNom β^a that change from -381.53 to -1748.07. As mentioned in section 5.2 (Variables) it may be because GRP in the counties vary during the crisis so that the treatment-effects are under or over-estimated. I assume that the remaining effect are a more precise estimation of the effects of the crisis. As GRP did not effect the direction of the coefficients (from negative to positive or the opposite), my interpretation is that it is valid to include GRP in the model as the general assumption of the effect of the crisis remains the same. Adding country and time fixed effects in model 3 also have some effect on the coefficients, although most are modest. It does however change the change in percent for permanent employment (PermPer) quantitatively. The explanation is that individual time-constant factors that vary across counties are controlled for.

Furthermore, standard errors for the absolute squared deviation (VarSq) coefficients are large for all variables except temporary paternal benefits. it indicates that the estimates are somewhat vague. As I am not interested in the actual VarSq figures, I do not consider vague estimates as a problem.

6.1.1 Wage

Figure 1: Wage DiD-graph

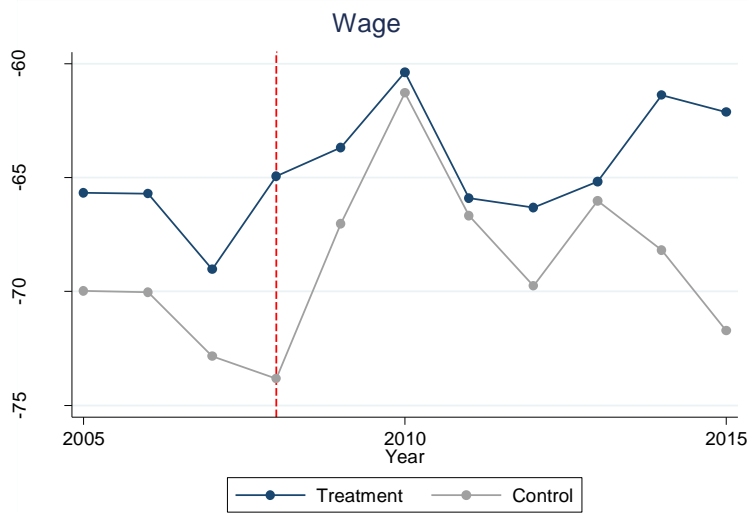


Figure 1 shows the outcome in the nominal change in wage in SEK per worker between men and women in the treatment and control counties during years 2005-2015. The vertical red line indicates the beginning of the financial crisis 2008. The Y-axis shows the outcome in SEK per worker and the X-axis shows years 2005-2015.

The graph in figure 1 shows the nominal difference in wage between men and women over time in the treatment and control counties. The graph illustrates that the parallel trend assumption does not hold as the trends for the treatment and control group are not similar before the crisis. Therefore, there is a risk that the outcomes are a continuation of the differences in trends before the crisis. For that reason, the DiD-outcomes should be interpreted with caution.

Table 2: Wage DiD-regressions frequency weighted by population

	Time period	Model 1 <i>DiD</i>	Model 2 <i>DiD + GRP</i>	Model 3 <i>DiD + FE</i>	Model 4 <i>DiD + GRP and FE</i>
WageNom: The nominal change in wage between women and men					
	During	1951.453*** (185.126)	1403.325*** (161.8478)	1882.034*** (100.8984)	1215.277*** (100.6169)
	After	-381.5375*** (155.0489)	-1748.07*** (132.6915)	-626.0905*** (83.6123)	-2190.783*** (87.0931)
R-squared		0.0503	0.3838	0.7442	0.7567
Observations		100.365	100.365	100.365	100.365
WagePer: The percentage change in wage between men and women					
	During	1.367771*** (0.0822133)	3.926737*** (0.0538266)	1.355964*** (0.0506996)	1.091405*** (0.0503342)
	After	-0.175978*** (0.0655563)	-9.092093*** (0.0440472)	-0.144812*** (0.0405429)	-0.476033*** (0.0419114)
R-squared		0.4223	0.4444	0.7749	0.7835
Observations		100.365	100.365	100.365	100.365
WageSq: The change in gender wage equality					
	During	-2.65e+08*** (2.25e+07)	-3.08e+08*** (1.20e+07)	-2.57e+08*** (1.28e+07)	-1.64e+08*** (1.28e+07)
	After	4.947695*** (1.83e+07)	-1.08e+09*** (1.02e+07)	3.68e+07*** (1.03e+07)	2.55e+08*** (1.04e+07)
R-squared		0.0671	0.4619	0.7361	0.7532
Observations		100.365	100.365	100.365	100.365

*p < 0.10. **p < 0.05. ***p < 0.001. Standard Error in parenthesis.

WageNom is the relative nominal change measured in SEK per worker. WagePer is the relative change measured in percent and WageSq is the relative change in gender equality. The time-periods titled *during* and *after* refers to during the crisis as years 2008-2009 and after the crisis as years 2010-2015. All variables are measures with respect to before the crisis 2005-2007.

Model 4 shows that in the counties more heavily affected by the crisis, female wage increase by 1 215.266 SEK per worker (corresponding to a 1.09% change) relative to male wage during the crisis. However, after the crisis female relative wage decrease by 2 190.786 SEK per worker (corresponding to a 0.48% change). The gender equality coefficient (TemSq) shows that wage gender equality increase during the crisis as women are better off than men and decrease after the crisis as women are worse off than men.

6.1.2 Temporary employment

Figure 2: Temporary employment DiD-graph

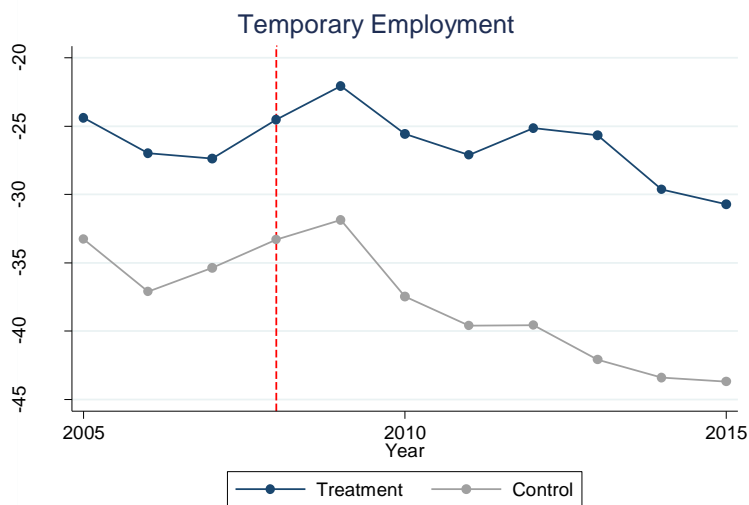


Figure 2 shows the outcome in the nominal change in temporary employment per capita between men and women in the treatment and control counties during years 2005-2015. The vertical red line indicates the beginning of the financial crisis in 2008. The Y-axis shows the outcome and the X-axis shows years from 2005-2015.

The graph in figure 2 shows the nominal difference between men and women in temporary employment over time in the treatment and control counties. The graph illustrates that the parallel trend assumption holds relatively poorly, as the trends for the treatment and control groups vary before the crisis. Therefore, there is a risk that the outcomes are a continuation of the differences in trends before the crisis. For that reason, the DiD-outcomes should be interpreted with caution.

Table 3: Temporary employment DiD-regressions frequency weighted by population

	Time period	Model 1 <i>DiD</i>	Model 2 <i>DiD + GRP</i>	Model 3 <i>DiD+ FE</i>	Model 4 <i>DiD + GRP and FE</i>
TemNom: <i>The nominal change in temporary employment between men and women</i>					
	During	-0.22869*** (0.01437)	-0.22911*** (0.01437)	-0.23084*** (0.01259)	-0.17616*** (0.01262)
	After	-0.25536** (0.01208)	-0.25639** (0.01206)	-0.25793*** (0.01016)	-0.12961*** (0.01027)
R-squared		0.0843	0.0843	0.2760	0.2969
Observations		100.365	100.365	100.365	100.365
TemPer: <i>The percentage change in temporary employment between men and women</i>					
	During	-2.319561*** (0.1566934)	-2.323973*** (0.1566329)	-2.332*** (0.1394034)	-1.813138*** (0.139649)
	After	-2.673457 (0.1324732)	-2.684457 (0.1323504)	-2.691768*** (0.1135032)	-1.474142*** (0.1142521)
R-squared		0.1199	0.1200	0.2826	0.2976
Observations		100.365	100.365	100.365	100.365
TemSq: <i>The change in temporary employment gender equality</i>					
	During	-0.000065*** (6.17e-06)	-0.000067*** (6.14e-06)	-0.000066*** (5.41e-06)	-0.00005*** (5.46e-06)
	After	-0.000037*** (4.76e-06)	-0.000042** (4.69e-06)	-0.000038*** (3.96e-06)	7.14e-07 (4.13e-06)
R-squared		0.6014	0.7184	0.2699	0.2832
Observations		100.365	100.365	100.365	100.365

*p < 0.10. **p < 0.05. ***p < 0.001. Standard Error in parenthesis.

TemNom is the relative nominal change measured in percentage points, TemPer is the relative change measured in percent and TemSq is the relative change in gender equality. The time-periods titled *during* and *after* refers to during the crisis as years 2008-2009 and after the crisis as years 2010-2015. All variables are measures with respect to before the crisis 2005-2007.

Model 4 shows that in the counties more heavily affected by the crisis, female temporary employment decrease by 0.18 percentage points (corresponding to a 1.81 percent change) relative to men during the crisis. The trend continues after the crisis as female relative temporary employment decrease by 0.13 percentage points (corresponding to a 1.47 percent change). The gender equality coefficient (TemSq) shows that temporary employment gender equality increase during the crisis as women are better off when regarding temporary employment as bad. β^a TemSq is not significant in model 4.

6.1.3 Permanent employment

Figure 3: Permanent employment DiD-graph

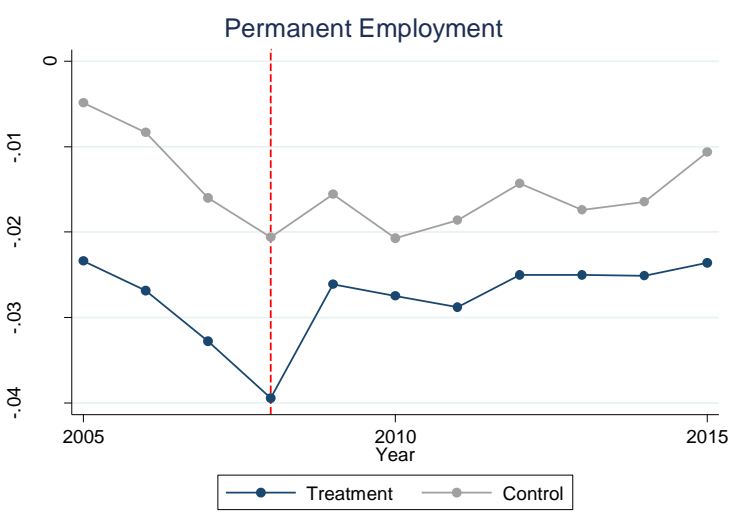


Figure 3 shows the outcome of the nominal change in permanent employment per capita between men and women in the treatment and control counties during years 2005-2015. The vertical red line indicates the beginning of the financial crisis in 2008. The Y-axis shows the outcome per capita and the X-axis shows years from 2005-2015.

The graph in figure 3 shows the nominal difference between men and women in permanent employment over time in the treatment and control counties. The graph illustrates that the parallel trend assumption holds well, as the trends for the treatment and control group are similar before the crisis.

Table 4: Permanent employment DiD-regressions frequency weighted by population

	Time period	Model 1 <i>DiD</i>	Model 2 <i>DiD + GRP</i>	Model 3 <i>DiD + FE</i>	Model 4 <i>DiD + GRP and FE</i>
PermNom: The nominal change in permanent employment between men and women					
	During	-0.32337*** (0.03003)	-0.39393** (0.02699)	0.34271*** (0.0182)	0.24827*** (0.01799)
	After	-0.83996** (0.02429)	-1.01586*** (0.01995)	0.88922*** (0.01301)	0.66758*** (0.01296)
R-squared		0.1702	0.4432	0.7313	0.7437
Observations		100.365	100.365	100.365	100.365
PermPer: The percentage change in permanent employment between men and women					
	During	0.6108172*** (0.0902165)	0.7974894*** (0.0779599)	0.6672241*** (0.0549102)	0.4115008*** (0.0546465)
	After	2.271628*** (0.0724823)	2.761352*** (0.0573878)	2.416634*** (0.0392653)	1.816522*** (0.0394587)
R-squared		0.1500	0.4693	0.7238	0.7341
Observations		100.365	100.365	100.365	100.365
PermSq: The change in permanent employment gender equality					
	During	0.0003659*** (0.0000177)	0.0003423*** (0.000017)	0.0003586*** (0.0000132)	0.0003628*** (0.0000134)
	After	-0.0001784 (0.0000107)	-0.000237*** (0.0000101)	-0.000195*** (7.47e-06)	-0.000185*** (7.68e-06)
R-squared		0.0879	0.2263	0.5355	0.5356
Observations		100.365	100.365	100.365	100.365

*p < 0.10. **p < 0.05. ***p < 0.001. Standard Error in parenthesis.

PermNom is the relative nominal change measured in percentage points, PermPer is the relative change measured in percent and PermSq is the relative change in gender equality. The time-periods titled *during* and *after* refers to during as years 2008-2009 and after as years 2010-2015. All variables are measures with respect to before the crisis 2005-2007.

Model 4 shows that in the counties more heavily affected by the crisis, female permanent employment increase by 0.25 percentage points (corresponding to a 0.41 percent change) relative to men during the crisis. The trend is even stronger after the crisis as female relative permanent employment increase by 0.67 percentage points (corresponding to a 1.82 percent change). The gender equality coefficients (TemSq) shows that temporary employment gender equality decrease during the crisis but increase after the crisis as women are better off than men both during and after the crisis¹³.

¹³ More insight as to why follows in section 7.1 (Discussion)

6.1.4 Unemployment

Figure 4: Unemployment DiD-graph

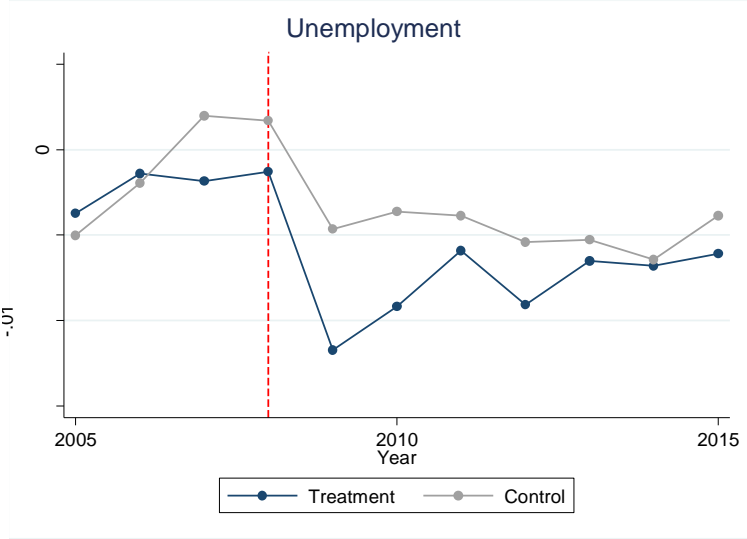


Figure 4 shows the outcome of the nominal change in unemployment per capita between men and women in the treatment and control counties during years 2005-2015. The vertical red line indicates the beginning of the financial crisis in 2008. The Y-axis shows the outcome per capita and the X-axis shows years from 2005-2015.

The graph in figure 4 shows the nominal difference between men and women in unemployment over time in the treatment and control counties. The graph illustrates that the parallel trend assumption does not hold as the trends for the treatment and control group are not similar before the crisis. Therefore, there is a risk that the outcomes are a continuation of the differences in trends before the crisis. For that reason, the DiD-outcomes should be interpreted with caution.

Table 5: Unemployment DiD-regressions frequency weighted by population

	Time period	Model 1 <i>DiD</i>	Model 2 <i>DiD + GRP</i>	Model 3 <i>DiD + FE</i>	Model 4 <i>DiD + GRP and FE</i>
UnemNom: <i>The nominal change in unemployment between men and women</i>					
	During	-0.43299 (0.01364)	-0.001082 (0.00974)	-0.43236*** (0.01006)	-0.36787*** (0.00985)
	After	-0.18074*** (0.00977)	-0.37934*** (0.00734)	-0.17478*** (0.00782)	-0.02345** (0.00769)
R-squared		0.1123	0.1299	0.4818	0.5195
Observations		100.365	100.365	100.365	100.365
UnemPer: <i>The percentage change in unemployment between men and women</i>					
	During	-12.50681*** (0.3806849)	-12.33246* (0.3849471)	-12.47767*** (0.2976934)	-10.78931*** (0.2935641)
	After	-6.582696*** (0.276199)	-6.148028*** (0.2766043)	-6.418828*** (0.2254798)	-2.456709*** (0.2213998)
R-squared		0.0858	0.0996	0.4442	0.4769
Observations		100.365	100.365	100.365	100.365
UnemSq: <i>The change in unemployment gender equality</i>					
	During	-0.000168*** (1.19e-06)	0.0000648*** (2.10e-06)	0.0000664*** (1.81e-06)	0.0000651*** (1.80e-06)
	After	-0.000011*** (1.09e-06)	0.0000398*** (1.64e-06)	0.0000434*** (1.37e-06)	0.0000405*** (1.34e-06)
R-squared		0.0204	0.0757	0.3974	0.3980
Observations		100.365	100.365	100.365	100.365

*p < 0.10. **p < 0.05. ***p < 0.001. Standard Error in parenthesis.

UnemNom is the relative nominal change measured in percentage points, UnemPer is the relative change measured in percent and UnemSq is the relative change in gender equality. The time-periods titled *during* and *after* refers to during the crisis as years 2008-2009 and after the crisis as years 2010-2015. All variables are measures with respect to before the crisis 2005-2007.

Model 4 shows that in the counties more heavily affected by the crisis, female unemployment decrease by 0.36 percentage points (corresponding to a 10.79 percent change) relative to men during the crisis. The trend continues after the crisis as female relative unemployment decrease by 0.02 percentage points (corresponding to a 2.46 percent change). The gender equality coefficients (TemSq) shows that the unemployment gender equality decrease both during and after the crisis, more so during than after, as women are better off than men.

6.1.5 Temporary paternal benefits

Figure 5: Temporary Paternal Benefits DiD-graph

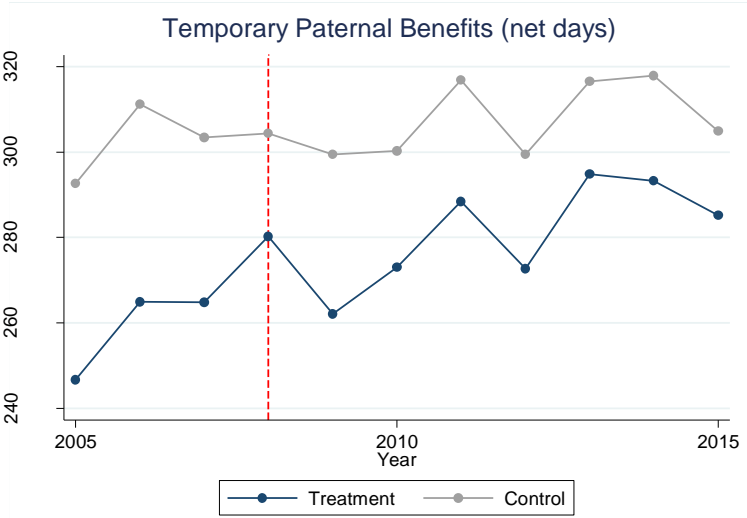


Figure 5 shows the outcome of the nominal change in temporary paternal benefit (net) days per capita between men and women in the treatment and control group during years 2005-2015. The vertical red line indicates the beginning of the financial crisis in 2008. The Y-axis shows the outcome per capita and the X-axis shows years from 2005-2015.

The graph in figure 5 shows the nominal difference between men and women in temporary paternal benefits over time in the treatment and control counties. The graph illustrates that the parallel trend assumption does not hold as the trends for the treatment and control group are not similar before the crisis. Therefore, there is a risk that the outcomes are a continuation of the differences in trends before the crisis. For that reason, the DiD-outcomes should be interpreted with caution.

Table 6: Temporary paternal benefits DiD-regressions frequency weighted by population

Time period	Model 1 <i>DiD</i>	Model 2 <i>DiD + GRP</i>	Model 3 <i>DiD + FE</i>	Model 4 <i>DiD + GRP and FE</i>
PatNom: <i>The nominal change in temporary paternal benefits between men and women</i>				
During	0.0128785 (0.0006073)	0.0143629*** (0.0004329)	0.0131457*** (0.0002791)	0.0095958*** (0.0002603)
After	0.0188643*** (0.0005081)	0.0225651*** (0.0003925)	0.0197573*** (0.0002534)	0.0114267*** (0.0002106)
R-squared	0.2465	0.5294	0.8199	0.8609
Observations	100.365	100.365	100.365	100.365
PatPer: <i>The percentage change in temporary paternal benefits between men and women</i>				
During	1.382824*** (0.0462368)	1.307622*** (0.0478157)	1.386249*** (0.0228003)	1.153339*** (0.0207152)
After	1.582428*** (0.0440393)	1.394943*** (0.0443678)	1.564953*** (0.0209596)	1.018378*** (0.0188534)
R-squared	0.2160	0.2880	0.8872	0.9047
Observations	100.365	100.365	100.365	100.365
PatSq: <i>The change in temporary paternal benefit gender equality</i>				
During	0.0080578*** (0.0003516)	0.00895*** (0.0002418)	0.0082262*** (0.0001608)	0.006008*** (0.0001473)
After	0.0114755*** (0.0002961)	0.0136999*** (0.0002241)	0.0120256*** (0.000149)	0.0068202*** (0.0001198)
R-squared	0.2488	0.5459	0.8177	0.8642
Observations	100.365	100.365	100.365	100.365

*p < 0.10. **p < 0.05. ***p < 0.001. Standard Error in parenthesis.

PatNom is the relative nominal change measured in days per capita PatPer is the relative change measured in percent and UnemSq is the relative change in gender equality. The time-periods denoted *during* and *after* refers to during as years 2008-2009 and after as years 2010-2015. All variables are measures with respect to before the crisis 2005-2007.

Model 4 shows that in the counties more heavily affected by the crisis, female temporary paternal benefits increase by 0.096 days per capita (corresponding to a 1.15 percent change) relative to men during the crisis. The trend is more or less the same after the crisis as female relative temporary paternal benefits increase by 0.01 days per capita (corresponding to a 1.02 percent change). The gender equality coefficient (TemSq) shows that temporary paternal benefits gender equality decrease during and after the crisis as women are worse off than men.

7. Discussion and conclusions

7.1 Discussion

In the following discussion and analysis, I will first examine how the financial crisis affects the labour market and paid labour and unpaid labour separately. I will base my final conclusion about how the financial crisis affects economic gender equality on the conclusions from the separate analyses.

As already mentioned, the parallel trend assumption does not hold for wage, unemployment and temporary paternal benefits. For that reason, the outcome and the following discussion based on Becker's taste discrimination model and the division of labour model should be interpreted with caution.

As Becker only use wage to explain the causal effect of discrimination in the taste discrimination model, I assume that wage is the final outcome on the labour market and the absolute indicator of labour market and paid labour gender equality. The assumption is central to the rest of my analysis.

At first it seems as the results during the crisis is in favour of Becker's taste discrimination model. According to the model, discrimination becomes costly as market competition increase. Firms with high coefficient of discrimination (d) for women have to disregard their true discrimination coefficient or take the risk of being driven out of business. The cumulative distribution function of the discrimination coefficient $C(d)$ for all firms decrease and the demand for female workers $N_w^d(\omega_m, \omega_w, C(d))$ increase. As the demand for women increase female wage increase and the wage gap $\omega_w < \omega_m$ is reduced. The DiD-outcomes shows that female relative permanent employment increase, female relative temporary employment decrease, female relative unemployment decrease, female relative wage increase and at means end, wage gender equality increase as predicted by Becker. The results are compatible with Black & Brainerd's (1999) and Black & Strahan's (2002) validations of the taste discrimination model.

The European Commission (2013) concludes that even if gender gaps are reduces as an effect of the crisis, it is not automatically the same as improved gender equality. Karamessini (2014) implies that reduced gender gaps are not due to an improved situation for women but a

worsened situation for men. As presented above, the DiD-outcomes during the crisis shows that men are worse off in all variables representing the labour market and paid labour. The DiD-outcomes also confirm that gender equality decrease for permanent employment and unemployment as women are better off than men but increase for temporary employments and wage.

Shallow interpretations of the wage DiD-outcomes do not distinguish the concrete reason for the positive change in relative wage. Holmlund & Storre (2002) concludes that during turbulent times, (short-time) temporary employments increase to cover for the loss of permanent employments¹⁴. It leads to a movement from permanent employment to temporary employment. In line with Holmlund and Storre, my DiD-outcomes shows a clear relative movement from male permanent employment to temporary employment and unemployment. The relative movement may affect male and female relative wages in two ways. First, it may lead to a decrease in male relative wages as unemployment do not pay wage at all. Second, according to Holmlund & Storre (2002), increased unemployment leads to adjustments in reservation wage applied on temporary employments as wage penalties. It indicates that the relative movement in the labour market may be part of the explanation for the change in relative wage. Male relative wage may also decrease as a consequence of lost bonuses in accordance with Black & Strahan's (2002) conclusions confirmed in the 2008-2009 crisis by the European Commission report (2013)¹⁵. Lost bonuses are most likely temporary and may return with the same gender distribution. Given these arguments, it can be claimed that the change in relative wage may not be due to an improved situation for women but a worsened situation for men. Instead of an actual increase in wage gender equality, the positive effects on wage gender equality may be a display of the ongoing discrimination and segregation on the labour market which gives that men and women are differently affected by the crisis.

Furthermore, even if the DiD-outcome shows that male relative wage decrease during the crisis, the decrease is not in proportion to the relative loss of employment. Male relative loss

¹⁴ Note that temporary employment has not increased in general in Sweden, but relatively for men in the treatment group as an effect of the crisis.

¹⁵ Black and Strahan's use the same conclusion in favour of the assumption that wage gaps decrease as an effect of market shocks, the European Commission do the opposite.

of employment is 9.39 percent¹⁶ but male relative loss of wage is 1.09 percent. The disproportion is 8.3 percent. Assuming that male employment is worth more wage than female employment (men earn more), a decrease in male relative employment should lead to a proportionally larger increase in female relative wage. As male relative loss of wage is smaller than the relative loss of employment, male relative wage per employee increase. it indicates that the actual wage gender equality has decrease during the crisis not increase as shown by the wage DiD-outcome.

Assuming that wage is the final outcome on the labour market, Becker’s taste discrimination model can be confirmed based on the wage DiD-outcomes during the crisis as they show that wage gender equality increase. However, it can be rejected based on the relative change in wage in proportion to the relative change in employment during the crisis as female relative wage do not increase in proportion to the increase in female relative employment.

The wage DiD-outcome after the peak of the crisis shows that female relative wage decrease as suppose to increase during the crisis. All other variable-outcomes representing the labour market and paid labour are consistent with the outcomes during the crisis but change in magnitude. Female relative permanent employment increase by more than during the crisis and female relative temporary employment and unemployment decrease but by less than during the crisis. It seems as the demand for female workers $N_w^d(\omega_m, \omega_w, C(d))$ increase but female relative wage decrease, suggestively partly explained by reintroduced bonuses for men. The outcome is not in favour of the taste discrimination model. According to the taste discrimination model, an increase in female demand should lead to an increase in wage gender equality. The wage DiD-outcomes shows that wage gender equality decrease. Furthermore, unemployment gender equality decrease as during the crisis but by *less* than during the crisis. Permanent employment gender equality decrease as suppose to increase during the crisis even though female relative permanent employment increase both during and after the crisis. One possible explanation is that female relative permanent employment after the crisis reach a point were it has the opposite effect on gender equality. Female relative permanent employment increase by too much – women are too much better of than men -

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$$-0.41\% \text{ permanent employment}^{men} + 1.81\% \text{ temporary employment}^{men} - 10.79\% \text{ unemployment} = -9.39\% \text{ employment}^{men}$$

causing the permanent employment gender equality to decrease. The gender equality DiD-coefficient for temporary employment is not significant after the crisis and should not be interpreted. Gender equality decrease for all other variables.

The relative employment after the crisis change comparing to during the crisis. Male relative employment decrease by 2.8 percent¹⁷ but male relative wage increase by 0.48 percent. The disproportion is 3.28 percent. The disproportion is smaller after the crisis than during the crisis.

Assuming that competition is still increased due to the market shock, Becker's taste discrimination model can be rejected after the crisis based on the wage DiD-outcomes as they show that wage gender equality decrease after the crisis. The model can also be rejected when analysing the relative change in wage in proportion to the relative change in employment as female relative wage decrease at the same time as male relative employment decrease.

It seems as market forces during and after the financial crisis in the Swedish context can not overcome gender discrimination as suggested by the taste discrimination model. However, the effect predicted by the model may possibly be hampered by the relatively limited Swedish free market hindered by government policies and union forces, some actually aiming to improve gender equality. As mentioned in section 3.1 (Becker's taste discrimination model), Becker's taste discrimination model does not consider that.

The arguments about wage in proportion to employment is not useful when analysing the link between paid labour and the labour market and unpaid labour as tangible wage are to be perceived as more important in the present when households decide how to divide labour. Therefore, I will base the following discussion on the wage DiD-outcomes only.

Despite the relative increase in female employment and wage during the crisis women take relatively more temporary paternal benefit days, in my thesis representing unpaid labour. It sums up to a relative increase in total workload, paid and unpaid, for women and a relative

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$-1.81\% \text{ permanent employment}^{men} + 1.47\% \text{ temporary employment}^{men} - 2.46\% \text{ unemployment} = -2.8\% \text{ employment}^{men}$

decrease in total workload for men during the crisis¹⁸. The findings are consistent with those of Aguiar, Hurst, & Karabarbounis (2010) and Hartmann, English, & Hayes (2010) who conclude that female relative unpaid labour increase as conditions on the labour market worsen for men. The outcomes conflict with Becker's division of labour model, first of all as the model assumes that recessions will not affect the division of paid and unpaid labour as households will not perceive recessions as affecting lifetime income. The temporary paternal benefits DiD-outcomes shows that the division of unpaid and paid labour change both during and after the crisis as an effect of the crisis (even though the change is relatively small), in accordance with Starr's (2010) findings.

But even in the light of Starr's arguments, the temporary paternal benefits DiD-outcomes are inconsistent with the division of labour model. Women's perceived bargaining power should increase during the crisis, as women's economic advantages increase in accordance with the division of labour model, however women still do more unpaid labour. The outcome is consistent with the findings of Leschke and Jepsen (2012) who imply that the crisis enhances traditional gender roles. Brines (1994), Greenstein (2002) and Bertrand, Kamenica & Pan (2013) conclude that as women earn more, men do more unpaid labour provided that men earn equal or more than women. If men earn less than women, social aspects take over and women do more unpaid labour to neutralize the earning inequality. The raw data used in my thesis do by no mean indicate that women earn more than men neither during nor after the crisis in any county. But an increase in male relative unemployment and a decrease in male wage relative female wage during the crisis may suggestively generate the same effects as noted by Brines (1994), Greenstein (2002) and Bertrand, Kamenica & Pan (2013).

After the crisis, temporary paternal benefits still increase (1.01 percent) but by less than during the crisis (1.15 percent). Even if the relative employment change compared to during the crisis and female relative wage decrease, the relative change in unpaid labour is fairly constant. If anything, it shows that social norms are slow-moving and consistent.

Rubery and Rafferty (2014) concludes that gender gaps first decrease but then increase as an effect of the financial crisis. Nyberg (2014) confirms the findings to be true in the Swedish context aswell. When only analysing wage DiD-outcome under the assumption that wage is the final outcome on the labour market, my outcomes agrees to the same conclusions.

¹⁸ Foregoing the possibility that temporary paternal benefits does not measure unpaid labour properly.

Furthermore, the improvement in male relative unemployment from during the crisis to after the crisis indicates that the outcomes from my thesis are in line with the European Commission's (2013) conclusions that male unemployment rates recovers faster than female unemployment rates. In total the findings leads to the conclusion that males are first and worse affected by the crisis but women bear the long-term scars.

It is debatable whether the tangible change in wage, that is the DiD-outcome, or wage in proportion to employment should be emphasized when analysing wage gender equality. I argue that actual wage per worker is a better definition of wage gender equality as it is more in line with "equal pay for equal work". Based on that I conclude that labour market and paid labour gender equality decrease both during and after the crisis as an effect of the crisis. As I define economic gender equality by the labour market and paid labour and unpaid labour and they all indicates a decrease in gender equality my only reasonable conclusion is that economic gender equality decrease as an effect of the crisis.

Sweden is a role model when it comes to gender equality. Sweden also managed to get through the crisis relatively unharmed with the admiration from governments around the world. However, it seems from my results as gender equality have been somewhat forgotten in the attempts to save the Swedish economy. If lessons learned from the 1990s recession helped to save the economy after the financial crisis 2008-2009, perhaps the lessons learned from the financial crisis 2008-2009 can be to better prepare for consequences on economic gender equality during recessions. The World Bank (2012) states that gender equality has a large impact on GDP. The statement implies that supporting economic gender equality during times of recessions may, in itself help to speed up the recovery, suggestively by strengthening gender mainstreaming.

7.2 Conclusions

The purpose of my thesis is to examine if the financial crisis 2008-2009 has any effects on economic gender equality in Sweden during (2008-2009) and after (2010-2015) the crisis and if so, how. The purpose is also to analyse if the outcomes are consistent with Becker's theoretical framework the taste discrimination model and the division of labour model.

Assuming that wage is the final outcome on the labour market, my conclusions are that Becker's taste discrimination model can be confirmed based on the wage DiD-outcomes during the crisis. However, it can be rejected when analysing the change in wage in proportion to the change in employment. After the crisis, the taste discrimination model can be rejected regardless of how the DiD-outcomes are interpreted. I claim that wage in proportion to employment is a better indicator of economic gender equality and conclude that labour market and paid labour gender equality decrease in both time-periods.

Becker's division of labour model can also be rejected as unpaid labour (temporary paternal benefits) gender equality decrease during and after the crisis regardless of the relative changes on the labour market and in paid labour. As labour market and paid labour and unpaid labour gender equality decrease during and after the crisis, the overall conclusion is that economic gender equality decrease as an effect of the crisis.

Future research may suggestively analyse the effects of the crisis using different indicators of the crisis, leading to different assigning of treatment and control groups and possibly different outcomes. A comparative case-study using countries with varying welfare states and labour market conditions would also be interesting.

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9. Appendix

Table 6: Assigning treatment and control group

County	Change in unemployment (%)	Ranking
Örebro Län	6,1	1
Blekinge Län	4,6	2
Gävleborgs Län	4,5	3
Östergötlands Län	3,8	4
Jönköpings Län	3,5	5
Jämtlands Län	3,4	6
Kalmar Län	3,3	7
Västra Götalands Län	3,3	8
Västmanlands Län	3,1	9
Dalarnas Län	2,8	10
Västerbottens Län	2,5	11
Värmlands Län	2,4	12
Kronobergs Län	2	13
Norrbottnens Län	2	14
Stockholms Län	1,7	15
Gotlands Län	1,7	16
Västernorrlands Län	1,3	17
Uppsala Län	1,2	18
Skåne Län	1	19
Södermanlands Län	0,9	20
Hallands Län	0,8	21

Counties ranked according to how badly they are affected by the crisis in percent change during the peak of the crisis from the third semester 2008 to the third semester 2009¹⁹.

¹⁹ In accordance with an article by Tillväxtanalys (2013).

Table 7: DiD-regressions not using frequency weighted by population

Variable	Time	Model 1	Model 2	Model 3	Model 4
UnemNom: The nominal change in unemployment between men and women					
	During	-0.27923 (0.36649)	-0.04158 (0.27876)	-0.27923 (0.26477)	-0.27759 (0.26543)
	After	-0.00621 (0.24724)	-0.4193** (0.19593)	-0.00621 (0.19591)	0.00272 (0.20073)
R-Squared		0.0432	0.0712	0.5156	0.5157
N		220	220	220	220
UnemSq: The change in unemployment gender equality					
	During	0.0000647 (0.00006)	0.0000643 (0.0000596)	0.0000647 (0.0000543)	0.0000582 (0.000039)
	After	0.0000481 (0.0000454)	0.0000456 (0.0000451)	0.0000481 (0.0000397)	0.0000666 (0.0000541)
R-Squared		0.0126	0.0199	0.3736	0.3782
N		220	220	220	220
UnemPer: The percentage change in wage between men and women					
	During	-9.121847 (10.39294)	-9.080936 (10.4107)	-9.121847 (8.053938)	-9.154598 (8.069307)
	After	-1.613894 (7.247732)	-1.391621* (7.216534)	-1.613894 (5.992107)	-1.79183 (6.160479)
R-Squared		0.0526	0.0546	0.4629	0.4630
N		220	220	220	220
WageNom: The nominal change in unemployment between men and women					
	During	-297.9911 (6147.335)	-575.6562 (5607.154)	-297.9911 (2736.374)	-434.909 (2714.731)
	After	-1914.571 (5279.275)	-3423.144** (4890.508)	-1914.571 (2519.528)	-2658.455 (2574.1)
R-Squared		0.0211	0.1809	0.7928	0.7943
N		220	220	220	220
WageSq: The change in unemployment gender equality					
	During	4.22e+07 (6.51e+08)	7.20e+07 (5.86e+08)	4.22e+07 (3.37e+08)	6.72e+07 (3.33e+08)
	After	1.33e+08 (5.28e+08)	2.94e+08*** (4.80e+08)	1.33e+08 (2.88e+08)	2.69e+08 (2.84e+08)
R-Squared		0.0205	0.2132	0.7428	0.7483

N		220	220	220	220
WagePer: <i>The percentage change in wage between men and women</i>					
	During	-.0350367 (2.839011)	-.1020921** (2.766678)	-.0350367 (1.362881)	-.0802766 (1.357384)
	After	-.2972456*** (2.405491)	-.661562*** (2.366796)	-.297245 (1.20276)	-.5430371 (1.224876)
R-Squared		0.2454	0.2863	0.8185	0.8192
N		220	220	220	220
PermNom: <i>The nominal change in permanent employment between men and women</i>					
	During	-0.41046 (0.84625)	-0.40179 (0.8538)	-0.41046 (0.50555)	-0.44229 (0.50599)
	After	0.91312 (0.57801)	0.96022* (0.57405)	0.91312** (0.35839)	0.74015** (0.36193)
R-Squared		0.0719	0.0853	0.6486	0.6559
N		220	220	220	220
PermSq: <i>The change in permanent employment gender equality</i>					
	During	0.0002636 (0.0004299)	0.0002584 (0.000428)	0.0002636 (0.0003587)	0.0002699 (0.0003598)
	After	-0.0004037 (0.0002681)	-0.0004318 (0.0002678)	-0.0004037* (0.0002143)	-0.0003693* (0.0002182)
R-Squared		0.0561	0.0753	0.4484	0.4495
N		220	220	220	220
PermPer: <i>The percentage change in permanent employment between men and women</i>					
	During	-1.252266 (2.509848)	-1.223459 (2.530532)	-1.252266 (1.513282)	-1.343904 (1.517467)
	After	2.659362 (1.745342)	2.815877 (1.73038)	2.659362** (1.098698)	2.16149** (1.110838)
R-Squared		0.0670	0.0834	0.6404	0.6471
N		220	220	220	220
TemNom: <i>The nominal change in temporary employment between men and women</i>					
	During	0.43601 (0.3998)	0.43728 (0.40034)	0.43601 (0.35587)	0.44022 (0.35792)
	After	-0.02997* (0.32327)	-0.02308* (0.32646)	-0.02997 (0.29825)	-0.00711 (0.0030297)
R-Squared		0.0831	0.0841	0.2487	0.2491
N		220	220	220	220
TemSq: <i>The change in temporary employment gender equality</i>					
	During	0.0001899 (0.0001615)	0.0001895 (0.000162)	0.0001899 (0.0001508)	0.0001912 (0.000152)
	After	0.0000672**	0.0000649*	0.0000672	0.0000738

		(0.0001267)	(0.0001272)	(0.000116)	(0.0001204)
R-Squared		0.0884	0.0892	0.2370	0.2373
N		220	220	220	220
TemPer: <i>The percentage change in temporary employment between men and women</i>					
	During	4.306014 (4.514737)	0.1454794 (3.476318)	4.306014 (4.027301)	4.348844 (4.042427)
	After	-0.871076 (3.615254)	-3.999355 (2.79479)	-0.871076 (3.36839)	-.6383741 (3.395258)
R-Squared		0.0836	0.0840	0.2487	0.2490
N		220	220	220	220
PatNom: <i>The nominal change in temporary paternal benefits between men and women</i>					
	During	0.0065564 (0.0129172)	0.0071322 (0.0103153)	0.0065564 (0.0063456)	0.0058618 (0.0061669)
	After	0.0057075** (0.0108127)	0.0088358 (0.0093458)	0.0057075 (0.0054709)	0.0019334 (0.0052779)
R-Squared		0.1095	0.2958	0.7994	0.8103
N		220	220	220	220
PatSq: <i>The change in temporary paternal benefit gender equality</i>					
	During	0.0037086 (0.0071134)	0.0040407 (0.0055173)	0.0037086 (0.003487)	0.0032797 (0.0033579)
	After	0.0032591** (0.0060149)	0.0050634 (0.005131)	0.0032591 (0.003043)	0.000929 (0.0028639)
R-Squared		0.1017	0.2999	0.7950	0.8083
N		220	220	220	220
PatPat: <i>The percentage change in temporary paternal benefits between men and women</i>					
	During	0.8260039** (1.082334)	0.8190548** (1.098042)	0.8260039 (0.5822416)	0.759721 (0.5539535)
	After	0.8323828 (1.041809)	0.7946279 (1.055812)	0.8323828 (0.5043499)	0.4722631 (0.5020501)
R-Squared		0.1014	0.1039	0.8449	0.8540
N		220	220	220	220

*p < 0.10. **p < 0.05. ***p < 0.001. Standard Error in parenthesis.

VarNom is the relative nominal change measured in days per capita. WageNom is the relative nominal change measured in SEK per worker. VarPer is the relative change measured in percent. and VarSq is the relative change in gender equality. The time-periods denoted during and after refers to during as years 2008-2009 and after as years 2010-2015. All variables are measures with respect to before the crisis 2005-2007.