Influence of the Last Occupations of the Unemployed on Gender Inequality: Evidence from Spain, Switzerland and the European Union

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Abstract

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Our paper aims to describe how gender inequality depends on the previous professions of the unemployed in Spain, Switzerland and the European Union. We rejected the hypothesis of hysteresis using the LM test for univariate series and the ILT test for panel data series only in the presence of one or two structural breaks, whose temporary impact has been proven using Half-life estimators. Cross-dependence has been proven using the Pesaran CD test on gender inequality in the occupations of the unemployed in Spain and the European Union, and has been rejected for Switzerland. It has been found that the disadvantage of one gender in the inequality between men and women in unemployment depends on the previous employment of the unemployed and that in all analysed territories there are some typical professions for each sex. The levels of inequality were lower when men were at a disadvantage.

Acknowledgements

1. Introduction

The previous occupations of unemployed individuals could increase their chances on the labour market, or on the contrary, they could make it more difficult for them to enter the labour market. Employer perception of the work position could also influence the re-employment of the unemployed. Employers may perceive that some occupations are more suitable for one gender than for the other, and they may make recruiting decisions based on their perception. Moreover, people can make mistakes when choosing an occupation. It may happen that they have chosen a position that does not suit them. This choice marks them in the eyes of future employers. When they choose a position that is different from their previous position, a future employer could identify them as unsuitable.

This paper proposes a new way of calculating unemployment gender inequality using the distinct previous occupations of unemployed individuals to compare unemployment in selected countries and the EU. We cannot use the absolute values of unemployment to obtain results because there is a different population and labour force in each country and in the EU. The unemployment rate used in Queneau and Sen (2007) gives asymmetric information about unemployment gender inequality, which is the reason why we have introduced a new indicator. The unemployment rate was constrained using intervals of gender inequality, and weighted using unemployment rates. The resulting indicator values are sorted into intervals to obtain categories of the degree of gender inequality. We have used fluctuations of 1.25%, 2.5%, 5% and more than 5% around the mean unemployment share of the labour market by occupation, which may be a limitation of the proposed indicator. If we want to use another level of fluctuation expressed as a percentage, the range of intervals must be recomputed. Consequently, unemployment gender inequality series calculated by this proposed method were used and compared for Spain, Switzerland and European Union data. We have compared these three territories as representative of the various unemployment rates in terms of both dynamics and levels to see if the inequality between the sexes in unemployment is comparable. Switzerland is also known as a country where gender equality is preferred in every aspect and this country tends to promote equality in every other aspect as well. Spain is not so active a country when it comes to supporting gender equality, this may be caused by their collectivist culture. This is the reason why we compare these two countries to discover the dynamics of gender inequality in terms of the structure of the unemployed based on their previous occupations. We examine whether gender equality policies could be applied to unemployment, since these are usually oriented towards the economically active population. We are also interested in the dynamics of unemployment gender inequality in this paper. Therefore, we look at the patterns of the annual differences and compare them within and between each territory. Further, we have investigated and compared unemployment gender inequality by previous occupation of the unemployed by country, to find some common behaviour patterns, which could be associated with a specific previous occupation. We have used unit root tests to allow structural breaks to describe unemployment gender inequality on the basis of the previous occupations of the unemployed as a process, and to discover whether the breaks have some impact on gender inequality and how strong and persistent the consequences of this impact are. Subsequently, we analyse cross-dependence within each country panel that consists of unemployment gender inequality according to the previous occupations of the unemployed, and display correlations between them. Finally, we aim to ascertain whether the level of the unemployment gender inequality

series depends on the disadvantaged gender during the gender inequality and the previous occupation of the unemployed.

This paper is structured as follows. In the second section, previous papers on gender and unemployment analysis are revisited. Section three introduces the data and methods used to analyse gender inequality in unemployment. We also introduce our indicator for gender inequality analysis of the unemployed according to their previous occupations. Subsequently, we introduce the unemployment gender inequality on the basis of the previous occupations of the unemployed, followed by the results from stationarity tests of the gender inequality series and dependency tests in section four. Finally, we present our conclusions.

2. Literature Preview

Analysis of gender discrepancies on the labour market started in 1970, while such discrepancies in unemployment have received more attention recently (Spielmann, 2006). The root of the gender inequality problem can be found throughout history from the misperception of women as weak and limited to being housewives, which is still a very firmly held perception in the minds of modern people as well (Krainska, 2016). Policies and their influence on gender inequality have been described in Zachorowska-Mazurkiewicz (2009), Mukhopadhyay (2015) and Borland and Coelli (2016). However, Klugman, Kolb and Morton (2014) claim that policies should not be oriented to increasing the participation of women on the labour market, but to give them the same rights as men on the labour market. Decreased gender inequality on the labour market could be achieved if women focus more on professions for which the labour market is not already saturated (Mihàilà, 2016). Gender inequality decreases with increases in wages (Anastasiade & Tillé, 2017), which leads to an increase of productivity in the long run (Kennedy, Rae, Scheridan & Valadkhani, 2017). According to Klasen and Minasyan (2017), economic growth could also be achieved by decreasing gender inequality on the labour market, while Bandiera and Natraj (2013) claim there is no proof of this connection.

Azmat, Gűell and Manning (2006) and Queneau and Sen (2007) are pioneers of unemployment gender gap investigations. These authors have calculated the unemployment gender gap as the difference between the unemployment rate of women and men, and as a ratio of the unemployment rate of women to men in order to analyse the gender gap. Results from the analysis of the gender position on the labour market indicate that women were worse off than men. With the increase of women's participation on the labour market, gender inequality increased (Elveren, 2014). The mismatch between labour market demand and educational attainment was only one of the reasons why women were unemployed more than men (Gokulsing & Tandrayen-Ragoobur, 2014). While transition between different employment states was higher for men (Theodossiou & Zangelidis, 2009), women transited more often to unemployment than to other employment (Koutentakis, 2015). Men had a greater chance of re-employment than women when they were unemployed. These opportunities have even increased in the case of married men, while being married for women reduces their chances even more (Baussola, Mussida, Jenkins & Penfold, 2015). Women spent more time in unemployment than men (Pašic, Kavkler & Boršič, 2011), but women, who participated in training designed to help the unemployed to re-employ faster, were preferred on the labour market more than men who attended the same training.

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Economic disturbances had, for instance, the opposite effect. They had a greater impact on men than on women. Economic disturbances reduced gender inequality in unemployment, according to the findings of Peiro, Belaire-Franch and Gonzalo (2012), Sahin, Song and Hobijn (2010) and De la Rica and Rebollo-Sanz (2017).

In the last fifty years, female participation on the labour market has increased, but the gender inequality, in the structure of the unemployed on the basis of previous occupations, has remained. When unemployed with the same previous occupation were compared by gender, women were less likely to receive unemployment insurance benefits (Michaelides & Mueser, 2013). Social protection in unemployment decreased labour force participation, and it was proven that the probability of women participating in the social transfer programme is higher than that of men (Yildirim & Dal, 2016). Karaoglan and Okten (2015) discovered that the probability of labour-force participation among women in times when their husbands were involuntarily released from work increased by four per cent, while the worsening economic situation only had a small negative effect on the labour-force participation of women. Berument, Dogan and Tansel (2009) discovered that a money shock could cause a decrease in unemployment across all sectors. In the short run, there was a greater impact on unemployment from income shocks, while in the long run, there was a greater impact from price shocks. The gender wage disparity was observed mostly in the private sector, while in the public sector, wages did not depend on gender (Seshan, 2013).

Bauer (2016) discovered that unemployed people who apply for a job in another occupation that is not the same as their previous one, stay unemployed for 2–3 months longer and get 1.3% – 1.6% lower wages than people who apply for a position that is comparable with their previous occupation. Gervais, Jaimovich, Siu and Yedid-Levi (2016) discovered that young workers change occupations very often because they are trying to find an occupation that suits them, and so they do not remain employed for a long time. They also discovered that changing occupation when re-employing results in large wage losses and that switching occupations declines with age. Hägglund and Bächmann (2017) argue that re-employment is affected by supply and demand in an occupation, changes in the occupational structure and occupational closure. Khalifa (2012) discovered that in times of negative aggregate technological shock, people with previous occupations that required high skills and education, moved to lower skilled occupations and in this way increased their chances of getting employed.

This paper contributes to the literature dealing with gender inequality in unemployment by proposing a new indicator for calculating unemployment gender inequality. We have validated the three hypotheses in this paper using the proposed indicator:
• "Gender Inequality does not depend on the previous occupation of the unemployed"
• "Gender Inequality does not depend on the level of gender inequality in unemployment"
• "The level of gender inequality in unemployment does not depend on gender inequality".

We check for stationarity in the computed series by following Bakas and Papapetrou (2014) and Khraief, Shahbaz, Heshmati and Azam (2015). Finally, we check if gender inequality and levels of gender inequality depend on previous occupations of the unemployed, and also if levels of gender inequality depend on which gender was disadvantaged most in unemployment.

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3. Data and Methodology

We employ annual data from the Eurostat database (2017), disaggregated by the volume of the unemployed by previous occupations and gender. Data from Spain, Switzerland and the European Union were used over the period 1996–2017. The data were processed using IBM SPSS, E-Views, Gauss and Rats software.

The statistical indicators used for the analysis in this paper will be described next, based on the Eurostat database definitions. As labour force population, we considered all people capable of working who declared being employed or actively looking for employment (later denoted as LF). Indicators of the labour force population of women LF^F and of the labour force population of men LF^M were obtained by disaggregating the labour force population by gender. A labour force population on the basis of each gender was subsequently disaggregated by employment condition. The fraction of the labour force population that was employed (denoted as E) and the fraction of the labour force population that was unemployed (denoted by U) was obtained. Finally, the labour force population was disaggregated by occupation. Figure 1 captures the basic disaggregation of the labour force population performed in this paper.

Figure 1. Structure of the Labour Force by occupation

Labour Force (LF)			
Labour Force of females (LF^F)		Labour Force of males (LF^M)	
Employed females (E^F)	Unemployed females (U^F)	Employed males (E^M)	Unemployed males (U^M)
Occupations E_F^{occ}	Previous occupations U_F^{occ}	Occupations E_M^{occ}	Previous occupations U_F^{occ}
Managers, professionals, and technicians	Managers, professionals, and technicians	Managers, professionals, and technicians	Managers, professionals, and technicians
Clerical, service, and sales workers	Clerical, service, and sales workers	Clerical, service, and sales workers	Clerical, service, and sales workers
Skilled agricultural and trades workers	Skilled agricultural and trades workers	Skilled agricultural and trades workers	Skilled agricultural and trades workers
Plant and machine operators, and assemblers	Plant and machine operators, and assemblers	Plant and machine operators, and assemblers	Plant and machine operators, and assemblers
Elementary occupations	Elementary occupations	Elementary occupations	Elementary occupations
	Not elsewhere classified		Not elsewhere classified

Source: Author's illustration based on Eurostat database definitions (2017)

Let us denote U^F and U^M as the number of all unemployed females and males. This means that U^F is 100% of the unemployed female labour force population, and U^M is 100% of the unemployed male labour force population. The proportions of the unemployed labour force population by specific previous occupation were calculated as $P_M^* = (U_M^{OCC^*}/U^M) \times 100$ and $P_F^* = (U_F^{OCC^*}/U^F) \times 100$ males and females respectively. The indicator U^{OCC^*} stands for a specific previous occupation of unemployed females (males); that is, it indicates the shares of females (males) among unemployed females (males) across the unemployed population in each gender group. Based on this calculus, the next statement was proven: $(\sum U_M^{OCC^*}/U^M) \times 100 = 100\% \Rightarrow \sum U_M^{OCC^*} = U^M \Rightarrow U^M = 100\%$ and $(\sum U_F^{OCC^*}/U^F) \times 100 = 100\% \Rightarrow \sum U_F^{OCC^*} = U^F \Rightarrow U^F = 100\%$.

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Unemployment rates on the basis of previous occupations were not calculated. Note that unemployment rate calculations are usually based on the distinct personal characteristics of the unemployed, such as educational attainment, gender and age. Personal characteristics are undeniable besides also being employed or unemployed. When an employed person switches from employment to unemployment, his or her age, educational attainment and gender does not change. An unemployment rate for any of these characteristics (denoted as ch) has been described as $\frac{U^{ch}}{U^{ch}+E^{ch}}$. This means that the unemployment rate was calculated as a percentage of all unemployed people that had certain personal characteristics compared to all people in the labour force with the same personal characteristics.

However, when an employed person switches from employment to unemployment, their previous occupation is not an unchangeable personal characteristic; however, it is related to the specific working activity they performed in the past, although they do not perform it at the moment. Therefore, the unemployment rate by previous occupation cannot be calculated as $\frac{U^{occ}}{U^{occ}+E^{occ}}$. The actual occupation of employed people cannot be related to the previous occupation of the unemployed; therefore, the unemployment rate cannot be calculated based on the unemployment rates based on personal characteristics of the labour force. An unemployment rate based on occupation does not exist because unemployed people do not have an occupation, only the structure of the unemployed based on their previous occupations can be described, which is the case in this paper.

The calculated proportion of men P_M^* and women P_F^* in all unemployed men and women were then multiplied by the unemployment rate for men (u_M) and women (u_F) to obtain the shares p_M^* and p_F^*. The calculation of P_M^* and P_F^* was performed on unemployed women (men), where $U^F = 100\%$ and $U^M = 100\%$, which was then disaggregated by occupation. We obtained the share of unemployed women (men) in the total labour force disaggregated by gender by multiplying with the unemployment rates of men and women. Now 100% of U^F and 100% of U^M equals the unemployment rate for women and men. More specifically, the unemployment rate for women is denoted as $u_F = (U^F/(U^F + E^F)) \Rightarrow 100\%\ U^F$ and the unemployment rate of men is denoted as $u_M = (U^M/(U^M + E^M)) \Rightarrow 100\%\ U^M$. When disaggregated by occupation, the next statement is proven $p_M^* = (U_M^{OCC^*}/U^M) \times (U^M/(U^M + E^M)) \times 100 = (U_M^{OCC^*}/LF^M) \times 100 \Rightarrow \sum p_M^* = u_M$ and $p_F^* = (U_F^{OCC^*}/U^F) \times (U^F/(U^F + E^F)) \times 100 = (U_F^{OCC^*}/LF^F) \times 100 \Rightarrow \sum p_F^* = u_F$. To further clarify, the actual occupations were not compared with the previous occupation of the labour force population, but we described the proportion of the unemployed by previous occupation based on the structure of the labour force by each gender. To achieve simplicity in the interpretation of the results, the proportion of the unemployed by previous occupation based on the structure of the labour force by each gender will later be stated as a share of the unemployed by previous occupation by gender.

After obtaining the shares of the unemployed by previous occupation for each gender, they can then be compared, and the presence of gender inequality can be identified over the labour force population according to distinct previous occupations. However, a connection between gender inequality by previous occupations and levels of unemployment has not been established. Therefore, by multiplying the share of each gender on the labour force with the total unemployment rate, we obtain weighted unemployment gender inequality (u_t^{wi}) denoted as:

$$u_t^{wi} = u_t^i \times \frac{u_t}{100} \tag{1}$$

where u_t stands for the average unemployment rate and u_t^{wi} is calculated as follows. If $p_M^* = p_F^*$ then $u_t^i = 0$. If $p_M^* > 0$ and $p_F^* = 0$ then $u_t^i = 1$. If $p_F^* > 0$ and $p_M^* = 0$ then $u_t^i = -1$. If $p_F^* < p_M^*$ then $u_t^i = ((p_F^*/p_M^*)-1) \times (-1)$ and if $p_M^* < p_F^*$ then $u_t^i = (p_M^*/p_F^*)-1$. The series of the gender inequality rate u_t^{inq}, analysed in this paper, is denoted as:

$$u_t^{inq} = u_t^{wi} \times 100 \qquad (2)$$

Our approach eliminated some shortcomings in the calculations of unemployment gender inequality based on the modified aisled steps in the methods proposed by Queneau and Sen (2007) and Azmat, Gűell and Manning (2006). Shortcomings such as the misinterpretation of the unemployment gender inequality as very high, when this was only as a consequence of high unemployment rates and a lack of consistency during the interpretation of the seriousness of unemployment gender inequality, which was as a consequence of only calculating gender inequality as a ratio of women to men in the unemployment rate without limitation. The proposed indicator of unemployment gender inequality according to previous occupations considers gender inequality as a percentage difference from the mean unemployment rate. Therefore, the results obtained are not dependent on the ratio, which was the case with the method that calculated it as a ratio of the female to male unemployment rate ($u^R = u_F/u_M$). For the purposes of this paper, we refer to this method as the 'ratio method'. The main issue with this method is the unequal measure of gender inequality, depending on the gender that had a higher unemployment rate. According to this method, $u^R \in [0;1]$ if the unemployment rate of men is higher than the unemployment rate of women, and $u^R \in [1;+\infty)$ if the unemployment rate of women is higher than the unemployment rate of men. Unequal intervals for gender inequality are hard to compare, when it comes to interpreting the results. As gender equality was, according this method, considered as $u^R = 1$. Consider two cases, in the first case $u^M = 20$ and $u^F = 25$ and in the second case $u^M = 25$ and $u^F = 20$. According to the ratio method, in the first case $u^R = 25/20 = 1.25$ and in the second case $u^R = 20/25 = 0.80$. If gender equality was settled at 1, why does gender inequality differ when we have the same unemployment rates? Why is gender inequality considered higher (1.25-1=0.25) in the case of the women's unemployment rate than the men's unemployment rate, than in the case when the unemployment rate of men is higher than that of women (1-0.8=0.2)? When the unemployment rates are the same, this method reports distinct gender inequality indicators $0.25 \neq 0.2$. The proposed indicator of gender inequality offers a solution to this issue by changing the denominator u_t^i so that the lower unemployment rate is always divided by the higher unemployment rate. Using this indicator, we have not only fixed the problem of the unequal gender inequality indicator having the same unemployment rates, but unemployment gender inequality had also been bound to an equally wide interval $\langle -100;100 \rangle$. If $u_t^{inq} \in \langle -100;0)$, men were disadvantaged compared to women (the unemployment rate for men is higher than the unemployment rate for women), and if $u_t^{inq} \in (0;100 \rangle$, the opposite is true. Zero is considered gender equality. An example is given for the calculation of gender inequality based on unemployment rates, but the same calculation could also be applied to shares of unemployed on the basis of previous occupation by gender to calculate gender inequality, which is the case solved in this paper. The proposed indicator is also more suitable for calculating gender inequality compared to the method when gender inequality is calculated as the difference between the unemployment rate for women and the unemployment rate for men, which we denote as the 'difference method'.

The difference method does not distinguish between high and low unemployment rates; therefore, it reports the same gender inequality even when unemployment rates are very high or low. For example, the gender inequality indicator is the same when the unemployment rate for women and men is 10 and 5 respectively, or 35 and 30 respectively – gender inequality would still be reported as 5. The proposed indicator of gender inequality is bound to levels of unemployment. Therefore, in the context of increased unemployment, gender inequality would be considered more precarious to assess. An assessment of unemployment gender inequality is more difficult when it exists at the same time as high unemployment rates. Alarming unemployment rates are usually more of a concern for policy makers. Seriously high unemployment rates should be assessed as a priority, since this issue could have more devastating consequences on the economic situation of the country. The severity of the gender inequality problem was assessed when gender inequality by unemployment rate was weighted. This makes it more severe as unemployment rates increase. By taking this step, gender inequality is not only calculated from the share of unemployed based on previous occupation, which is in summary always 100 per cent, but also depends on the behaviour of the unemployment rates as they change over time.

Grading the severity of unemployment gender inequality based on previous occupation was performed as follows. Let us assume that the whole labour force population is unemployed. Now assume that there should be gender equality, so we assume that 50% of them are women and 50% are men. Moreover, let us assume they are equally distributed on the basis of previous occupations. There are six occupations in each of them and there should be 50/3% of each unemployed. This is an ideal situation that would never occur, or at least the probability of its occurrence is very low. Let us permit some gender inequality fluctuation, specifically 1.25%, 2.5%, 5% and more than 5%. These are fluctuations around the mean. Since there should be an equal number of unemployed men and women, the mean equally distributed by occupation should be 50/3%. Let us define the interval of 1.25% as gender equality or permitted gender inequality. Unemployment rates which comply with this condition were then calculated as 50/3-1.25%*50/3 and 50/3+1.25%*50/3, which means that the share of the unemployed by each occupation by gender should be 16.458 and 16.875. The first interval of gender inequality was then calculated as ((16.458/16.875)-1)*100=-2.471 and ((16.458/16.875)-1)*(-1)*100=2.471, and the interval was therefore set to (-2.471; 2.471). When we calculate back, we find that gender inequality is 1.25% around the mean gender share on the labour market by occupation. Intervals were also calculated for fluctuations of 2.5%, 5% and more than 5% around the mean unemployment share of the labour market by occupation, and these are displayed in Table 1.

Furthermore, the hypothesis of hysteresis of the unemployment gender inequality series was validated using the LM unit root test explained by Lee, Strazicich and Meng (2012), which uses the following data generating process:

$$y_t = \delta'Z_t + e_t, e_t = \beta e_{t-1} + \varepsilon_t,$$ (3)

where Z_t represents a vector of exogenous variables that depend on the model used. We have validated the hypothesis of hysteresis for the model without the presence of a structural break $Z_t = [1,t]'$, with one structural break $Z_t = [1,t,D_{1t},DT^*_{1t}]'$ and finally, with the presence of two structural breaks $Z_t = [1,t,D_{1t},DT^*_{1t},D_{2t},DT^*_{2t}]'$, where $D_{it} = 1$ if $t \geq T_{Bi} + 1$, zero otherwise and $DT^*_{it} = t - T_{Bi}$ if $t \geq T_{Bi} + 1$, zero, otherwise (i=1 for the model with one structural break,

i=2 with two structural breaks). The LM unit root test statistic ($\tilde{\tau}$) was estimated to validate the unit root null hypothesis ø = 0 for the regression:

$$\Delta y_t = \delta' \Delta Z_t + \phi \tilde{S}_{t-1} + e_t \tag{4}$$

where represents the first difference operator of y_t, $\tilde{S}_t = y_t - \tilde{\psi} - Z_t \tilde{\delta}$, $\tilde{\psi} = y_1 - Z_1 \tilde{\delta}$, $t = 2,...,T$. $\tilde{\delta}$ represents the coefficients of the exogenous variables in the regression $\delta' = \delta_1$ for the model without the structural break, $\delta' = \left(\delta_1, \delta_2, \delta_3\right)$ for the model with one structural break and $\delta' = \left(\delta_1, \delta_2, \delta_3, \delta_4, \delta_5\right)$ for the model with two structural breaks). Structural break points T_{Bi}, were determined from the grid $LM_\rho = \inf_\lambda \tilde{\rho}\left(\lambda\right)$ and $LM_\tau = \inf_\lambda \tilde{\tau}\left(\lambda\right)$ when the $\tilde{\tau}$ was minimized – here $\tilde{\rho} = T.\tilde{\phi}$ and $\lambda = T_B/T$ (Khraief, Shahbaz, Heshmati, & Azam, 2015). By applying the LM unit root test, we can reject the hypothesis of hysteresis, which on the contrary is free of bias and spurious rejections, unlike the previous unit root test (Meng, Strazicich, & Lee, 2017).

The persistence of the consequences of the economic disturbances on the unemployment gender inequality series based on the previous occupations of the unemployed has been validated using the half-life estimator (Queneau & Sen, 2007), denoted as

$$HL_\rho = \frac{\log\left(0.5\right)}{\log\left(\rho\right)}, \tag{5}$$

where $\rho = \phi + 1$ for the rewritten regression (4)

$$y_t - y_{t-1} = \delta' \Delta Z_t + \left(\rho - 1\right) \tilde{S}_{t-1} + u_t. \tag{6}$$

Consequently, we have validated the cross-dependence of the country panel for unemployment gender inequality based on the previous occupations of the unemployed, for the null hypothesis that is independent, by applying the Pesaran CD test denoted as:

$$CD = \sqrt{\frac{2T}{N\left(N-1\right)}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right)} \tag{7}$$

where $\hat{\rho}_{ij}$ stands for the average of pairwise correlation coefficients from the ADF regression of the OLS residuals (Bakas & Papapetrou, 2014).

The hypothesis of hysteresis was validated for the panel data of unemployment gender inequality based on previous occupations by applying the ILT Unit Root Test proposed by Im, Lee and Tieslau (2005), which was based on the regression:

$$\Delta Y_{i,t} = \gamma_i' \Delta Z_{i,t} + \delta_i \hat{S}_{i,t-1} + \varepsilon_{i,t} \tag{8}$$

where $\hat{S}_{i,t-1}$ represents the detrended variable $Y_{i,t-1}$ and $\varepsilon_{i,t}$ represents the error term.
The panel LM *t-statistic* $LM\left(\bar{t}\right)$ was computed as the mean of LM *t*-statistics, denoted as $\bar{t}$, which validates the null hypothesis $\delta_i = 0$ and is denoted as:

$$\bar{t} = \frac{1}{N}\sum_{i=1}^{N} t_i^*, \tag{9}$$

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$$LM\left(\overline{t}\right) = \frac{\sqrt{N}\left(\overline{t} - E\left(\overline{t}\right)\right)}{\sqrt{V\left(\overline{t}\right)}},$$ (10)

$E\left(\overline{t}\right)$ and $V\left(\overline{t}\right)$ are described in the paper by Im, Lee and Tieslau (2005).

To check whether unemployment gender inequality depends on the previous occupations of the unemployed, or if the level of unemployment gender inequality depends on the previous occupations of the unemployed or the fact that women or men were at a disadvantage in unemployment gender inequality, we have computed three categories (Table 1).

Table 1. Categories of the degree of gender inequality

	Rule	Category Component
Gender Inequality	$p_f^* < p_m^*$	Men
	$p_m^* < p_f^*$	Women
	$p_m^* = p_f^*$	Equality
Levels of gender inequality	$u_t^{inq} \in \left(-2.471; 2.471\right)$	Equality
	$u_t^{inq} \in \left(-4.859; -2.471\right) \cup \left(2.471; 4.859\right)$	Low inequality
	$u_t^{inq} \in \left(-9.543; -4.859\right) \cup \left(4.859; 9.543\right)$	Medium inequality
	$u_t^{inq} \in \left(-100; -9.543\right) \cup \left(9.543; 100\right)$	High inequality
Previous occupations of the unemployed		Managers, professionals, and technicians
		Clerical, service, and sales workers
		Skilled agricultural and trades workers
		Plant and machine operators, and assemblers
		Elementary occupations
		Not elsewhere classified

Source: Own calculations

Subsequently, the categories were compared for dependence using a Pearson Chi-Square and the strength of the association was measured using Cramer's V.

4. Empirical Results

4.1. Previous Occupations of the Unemployed and Gender Inequality

Gender inequality differs depending on the previous occupations of the unemployed. In the European Union and Spain, the difference is noticeable and steady. Women were unemployed more than men among those who previously worked as plant and machine operators or assemblers and as skilled agricultural and trade workers. While men were unemployed more than women among those who previously worked as clerical, service, and sales workers or as managers, professionals, and technicians. Among those who were not elsewhere classified because they had not worked before or other reasons, there were more unemployed men than women. There were no women unemployed that previously worked in the armed forces.

Gender inequality was minimal or almost non-existent among those who were previously unemployed in elementary occupations. When looking at Switzerland, we observe that after 2000, there were more unemployed women than men that previously worked as skilled agricultural and trade workers, while there were more men than women unemployed who previously worked as clerical, service and sales workers. In Switzerland, there were no people that previously worked in the armed forces. There was no gender inequality among the unemployed people that previously worked in other occupations (Figure 2).

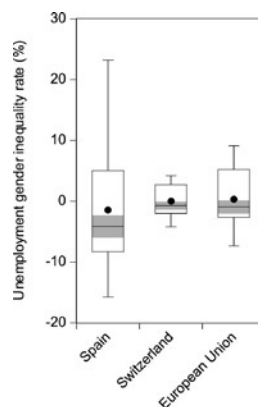Figure 2. Unemployment gender inequality by previous occupation
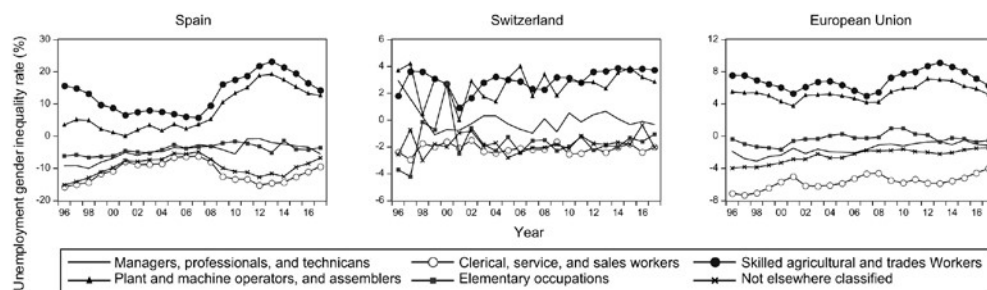
Source: Author's illustration

We observe the highest unemployment gender inequality in Spain. Comparing Spain with the European Union and Switzerland, unemployment gender inequality in Spain was twice as high as in the European Union and four times higher than in Switzerland. It has also been proven that women were usually unemployed more than men in all three territories (Figure 3). Spain exhibited the highest volatility of unemployment gender inequality, while Switzerland exhibited the lowest volatility.

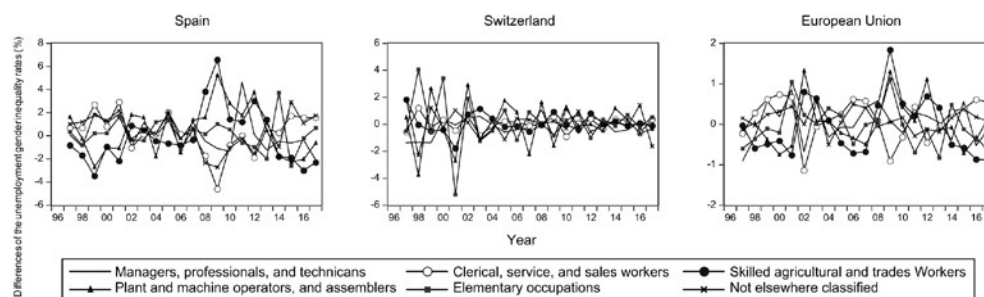Figure 3. Comparison of unemployment gender inequality by country

Source: Author's illustration

Annual differences in unemployment gender inequality by distinct previous occupations of the unemployed were volatile for all three territories. The highest impact on unemployment

gender inequality based on distinct previous occupations of the unemployed was reported due to the financial crisis in 2008, in Spain and the European Union, while this economic disturbance did not influence the gender inequality series based on distinct previous occupations of the unemployed in Switzerland (Figure 4). We have not found any obvious behaviour of the annual differences of the unemployment gender inequality series by distinct previous occupations of the unemployed in any of the three territories.

Figure 4. Annual differences in unemployment gender inequality by previous occupation
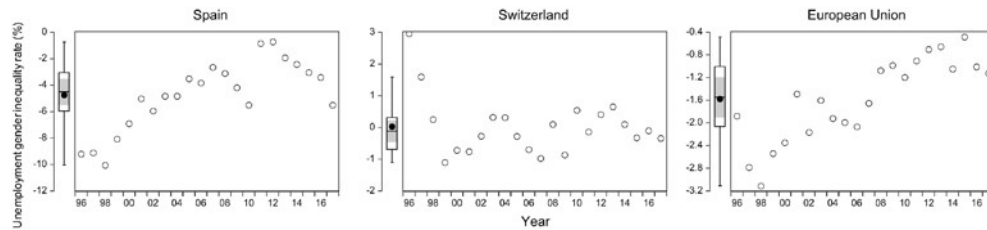

Source: Author's illustration

4.2. Comparison of Unemployment Gender Inequality by Previous Occupation

We compare unemployment gender inequality for all three territories by all previous occupations of the unemployed to identify whether there have been some visual similarities and how they behaved over time.

Observing gender inequality in unemployment according to the different previous occupations of the unemployed, we gained a deeper insight into how they were different in time and whether this tendency was similar in each country, or if each country had a different impact on gender inequality in unemployment, different from the previous occupations of the unemployed, which caused an opposite tendency in behaviour or no tendency at all, only random behaviour. In Switzerland, gender inequality was low for people who previously worked as managers, professionals and technicians. We observe periods when the unemployment rate for women was higher than the unemployment rate for men and vice versa. Unemployment gender inequality for those who previously worked as managers, professionals and technicians was decreasing in Spain and the European Union. Women in this profession were always unemployed more often than men. High volatility of unemployment gender inequality was found in Switzerland, while being the lowest among the three territories observed in this study; in addition, the greatest difference in unemployment gender inequality was found in Spain. and the other two territories (Figure 5). Even though we observe that unemployment gender inequality behaves similarly among people who previously worked as managers, professionals and technicians in Spain and the European Union, we cannot assume this is a factor that has an impact on its behaviour since we have not found any sign of it in Switzerland.

**Figure 5.** Managers, professionals, and technicians

Source: Author's illustration

During the observed period, the share of unemployed women on the labour force that were previously employed as clerical, service and sales workers was always higher than the share of unemployed men with the same previous employment in all three territories. High volatility of unemployment gender inequality rates was also found in Switzerland for this particular previous occupation. The highest unemployment gender inequality was found in Spain. The economic crisis in 2008 had the greatest impact on Spain and women who worked as clerical, service and sales workers, and this crisis caused an increase in unemployment gender inequality that had been rapidly decreasing in the previous period. We observe that after the main crisis period was over, gender inequality recovered its previous tendency, even though the effect on it from the crisis lasted longer. Unemployment gender inequality in the European Union was decreasing slowly but steadily. The economic crisis in 2008 had a small impact, after which it recuperated very quickly, and it resumed its original tendency (Figure 6). We have not found any similar behaviour in the unemployment gender inequality of those who previously worked as clerical, service and sales worker, but it was found that unemployment gender inequality that disadvantaged women persisted in all three territories.

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**Figure 6.** Clerical, service, and sales workers
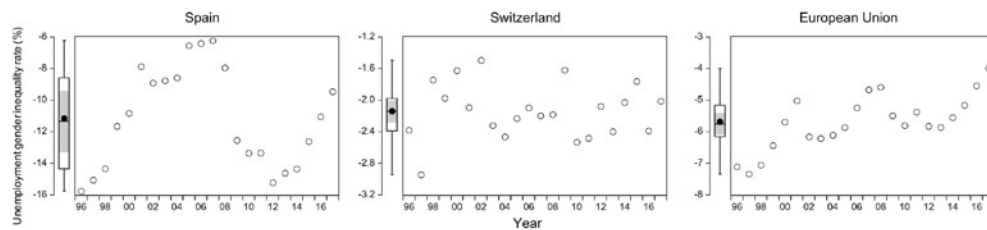
Source: Author's illustration

The share of unemployed men on the labour force, who previously worked as skilled agricultural and trade works, was higher than the share of the unemployed women on the labour force, with the same previous occupation in Spain and in the European Union. In Switzerland, at the beginning of the observed period, the share of unemployed women on the labour force with this particular previous occupation was higher than the share of unemployed men on the labour force with the same previous occupation. However, since then the share of unemployed men on the labour force became perpetually higher than the share of unemployed women on the labour force and it appears that this is increasing (Figure 7). A similar behaviour of unemployment gender inequality between the European Union

and Spain involving those who previously worked as skilled agricultural and trade workers was detected. The same proof has not been found in Switzerland, not even that gender inequality in this particular previous occupation of the unemployed could be related to a disadvantage for one gender.

Before the crisis in 2008, the share of unemployed men on the labour force was steady and slightly higher than the share of unemployed women on the labour force that previously worked as plant and machine operators and assemblers for both Spain and the European Union. At the time before the crisis in 2008, unemployment gender inequality for this previous occupation was even lower than the same unemployment gender inequality in the European Union. The crisis in 2008 caused a sharp increase in unemployment gender inequality in Spain, and only a slight or minor increase in unemployment gender inequality in the European Union. High volatility in unemployment gender inequality for this specific previous occupation was found in Switzerland. Even though there were more unemployed men than women, we also observe periods in which women who previously worked as plant and machine operators and assemblers were unemployed more than men with the same previous occupation.

Figure 7. Skilled agricultural and trades workers
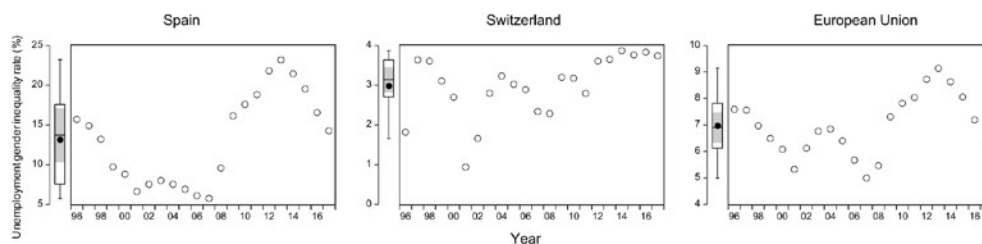
Source: Author's illustration

We observe in Switzerland that when unemployment gender inequality occurred, it occurred at similar levels for both genders. It is interesting to observe that unemployment gender inequality for the unemployed who previously worked as plant and machine operators and assemblers in Switzerland moves in wider intervals than unemployment gender inequality for the same group of previous occupations in the European Union (Figure 8). This suggests that gender inequality among the unemployed who previously worked as plant and machine operators and assemblers was worse in Switzerland than in the European Union. Once again, similar behaviour of unemployment gender inequality for this specific previous occupation of the unemployed was similar in Spain and the European Union, even in respect to the gender which was at a disadvantage, since proof of this was not found in Switzerland. We could not conclude that unemployment gender inequality depends on this specific previous occupation.

Figure 8. Plant and machine operators, and assemblers
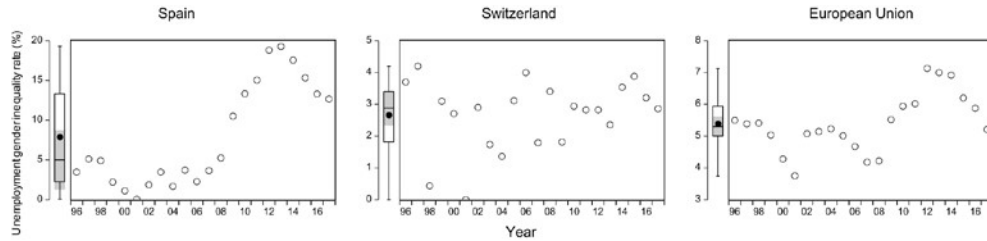
Source: Author's illustration

Spain exhibits a steady decrease in unemployment gender inequality among those who previously worked in elementary occupations, even though decreased gender inequality persists here. An interesting development occurred in the European Union in regard to the unemployment gender inequality for those who previously worked in elementary occupations, where the disadvantaged gender switched. At first, women who previously worked in elementary occupations were unemployed more than men with the same previous occupation, which then smoothly changed to unemployment gender inequality that disadvantages men. Even so it remained low, and lower than in Switzerland, where people who were previously employed in elementary occupations exhibited more unstable, and therefore, concerning behaviour (Figure 9). No common pattern of unemployment gender inequality was found for those who were previously employed in elementary occupations across Spain, Switzerland and the European Union.

Spain and the European Union exhibited absolute gender inequality, since only men were previously employed in the armed forces. However, in Switzerland nobody who was previously employed in the armed forces was registered as unemployed. For this reason, the unemployed that previously worked in the armed forces were neglected in this study, since we could not measure unemployment gender inequality when we had only one gender in the data set.

Among those who were not elsewhere classified according to previous occupation, the share of unemployed women on the labour force was higher than the share of unemployed men on the labour force for all three territories. The highest unemployment gender inequality for those who were not elsewhere classified was observed in Spain. Unemployment gender inequality of those who were not elsewhere classified decreased in Spain and the European Union, while Switzerland exhibited high volatility.

Figure 9. Elementary occupations

Source: Author's illustration

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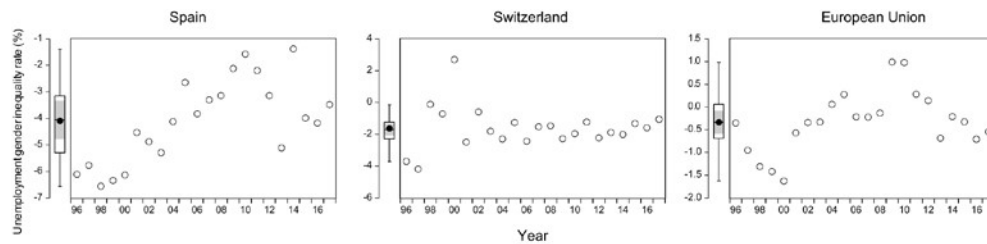
Even so, unemployment gender inequality was the lowest among the three territories based on those unemployed that were not elsewhere classified (Figure 10). A common feature between the three was that in all of them the share of unemployed women on the labour force was higher, but no other similarities were found, since a decrease in gender inequality was not proven for Switzerland for the whole observed period, except for the second half.

Figure 10. Not elsewhere classified
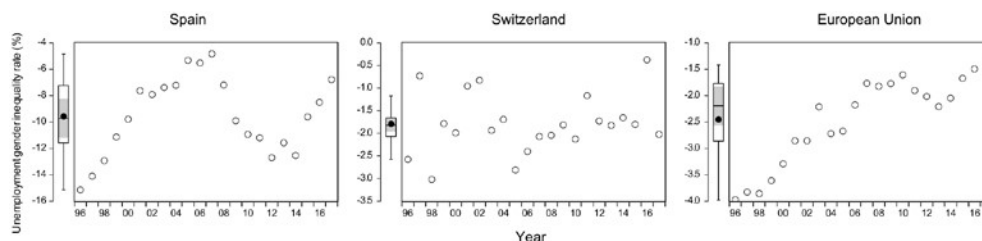
Source: Author's illustration

4.3. Results from Univariate – Unit Root Tests

The hypothesis of hysteresis could not be rejected without the presence of structural breaks for all three territories. Allowing for structural breaks, we have increased the power of the test of the series, which were only impacted by economic disturbances but otherwise behaved as stationary processes. We analysed unemployment gender inequality series for stationarity around the intercept and slope in the presence of one and two structural breaks. The hypothesis of hysteresis was rejected for unemployment gender inequality series in Switzerland and the European Union, where one structural break was included. The best results were obtained when two structural breaks were included, since in this case all unemployment gender inequality series behaved as stationary processes at the 1% level (Table 2).

The obtained results are consistent with the results of Queneau and Sen (2007) and Bakas and Papapetrou (2014), who also only rejected the hypothesis of hysteresis for unemployment gender inequality with structural breaks included.

The first structural break occurred before 2004 in Spain and the European Union in the majority of the unemployment gender inequality series by previous occupations. The first structural break in gender inequality series for those that previously worked as managers, professionals and technicians in the European Union and Spain occurred around 2006. The second structural break in the European Union and Spain occurred around the economic crisis in 2008 and in later years. The occurrence of structural breaks in the unemployment gender inequality series of Switzerland depended on the previous occupations of the unemployed (Table 2).

Table 2. LM test results

	Without structural break		With one structural trend break			With two structural trend breaks			
	Φ	k	Φ	T_B	k	Φ	T_{B1}	T_{B2}	k
Spain									
Managers, professionals, and technicians	-0.577 (-1.858)	0	-0.932* (-3.290)	2011	0	-2.141*** (-9.112)	2007	2009	5
Clerical, service, and sales workers	-0.117 (-1.192)	0	-0.579 (-2.658)	2008	4	-1.292*** (-8.433)	2004	2007	5
Skilled agricultural and trades workers	-0.142 (-1.919)	1	-0.774*** (-4.512)	2007	3	-1.382*** (-9.807)	2004	2007	5
Plant and machine operators, and assemblers	-0.171 (-1.649)	1	-0.642* (-3.550)	2007	2	-1.476*** (-8.448)	2004	2010	2
Elementary occupations	-0.789* (-2.940)	0	-2.204*** (-5.316)	2010	1	-1.959*** (-7.037)	2009	2013	1
Not elsewhere classified	-0.197 (-2.112)	2	-0.693* (-3.422)	2007	2	-1.594*** (-9.026)	2003	2010	4
Switzerland									
Managers, professionals, and technicians	-0.230 (-1.547)	1	-1.681*** (-5.045)	2006	4	-2.795*** (-10.671)	2006	2013	5
Clerical, service, and sales workers	-1.046*** (-3.963)	0	-2.063*** (-4.654)	2008	4	-3.645*** (-6.618)	2008	2015	5
Skilled agricultural and trades workers	-0.947*** (-5.051)	1	-0.983*** (-5.319)	2007	1	-2.341*** (-6.687)	2008	2010	4
Plant and machine operators, and assemblers	-0.879*** (-4.437)	0	-1.172*** (-5.444)	2014	0	-1.577*** (-6.969)	2002	2008	5
Elementary occupations	-0.641*** (-4.094)	2	-1.383*** (-5.183)	2002	0	-1.051*** (-10.747)	2008	2011	2
Not elsewhere classified	-1.416** (-3.359)	3	-1.191*** (-4.254)	2004	0	-1.439*** (-5.066)	2002	2004	0
European Union									
Managers, professionals, and technicians	-0.457 (-2.033)	0	-1.238*** (-4.993)	2007	0	-1.557*** (-6.808)	2006	2010	0
Clerical, service, and sales workers	-0.403 (-2.564)	0	-2.316*** (-5.129)	2011	3	-5.796*** (-10.922)	2004	2013	5
Skilled agricultural and trades workers	-0.257 (-2.447)	1	-1.062*** (-5.819)	2010	1	-1.239*** (-9.240)	2004	2007	5
Plant and machine operators, and assemblers	-0.282 (-1.997)	0	-1.486*** (-5.146)	2010	2	-1.818*** (-11.944)	2008	2010	4
Elementary occupations	-0.457 (-2.104)	0	-0.852 (-3.159)	2008	0	-5.049*** (-5.225)	2003	2009	5
Not elsewhere classified	-0.295 (-1.507)	0	-0.743* (-3.211)	2002	1	-2.958*** (-5.592)	2004	2014	5

Note: ***Significant at 1%; **Significant at 5%; *Significant at 10%. The 1%, 5%, 10% critical values for the test without a break are -3.63, -3.06 and -2.77, for the test with one break are -4.239, -3.566 and -3.211, for the test with two breaks are -4.545, -3.842 and -3.504. Numbers in parenthesis under the estimated coefficients are *t*-statistics for the null hypothesis.
Source: Own calculations

4.4. Half-life Estimator Results

The consequences from the impact of structural breaks were only temporary in most of the unemployment gender inequality series by previous occupation for the unemployed in both models that allow for structural breaks. We observe that structural breaks had a greater impact on the unemployed who were previously employed in elementary occupations in Spain, the unemployed that were previously employed as clerical, service or sales workers in Switzerland and those who were previously employed as plant and machine operators and assemblers in the European Union. The economic disturbance had minimal impact on the unemployed in the European Union. Even in most of the cases, the impact of the economic disturbances on unemployment gender inequality by previous occupation for the unemployed was minimal and the consequences from it disappeared quickly. There were still some exceptions, which required more time to recover to its equilibrium (Table 3).

Table 3. Half-life estimators

	One structural break			Two structural breaks		
	Spain	Switzerland	European Union	Spain	Switzerland	European Union
Managers, professionals, and technicians	0.258	1.804	0.483	5.255	1.185	1.184
Clerical, service, and sales workers	0.801	11.345	2.524	0.563	0.713	0.442
Skilled agricultural and trades workers	0.466	0.170	0.249	0.720	2.362	0.484
Plant and machine operators, and assemblers	0.675	0.394	0.961	0.934	1.260	3.450
Elementary occupations	3.734	0.722	0.363	16.557	0.233	0.496
Not elsewhere classified	0.587	0.419	0.510	1.331	0.842	1.032

Source: Own calculations

Previous studies, such as Bakas and Papapetrou (2014) and Queneau and Sen (2007), also confirm that the influence of the economic disturbances on unemployment gender inequality existed and the consequences of it disappeared quickly.

4.5. Results from the Cross-Dependence Test

It has been proven that unemployment gender inequality depends on the previous occupations of the unemployed in Spain and the European Union, while in Switzerland this relationship has not been found. While there are some occupations in Spain and the European Union, which are typical for one gender, this is not the case in Switzerland (Table 4).

Table 4. Cross-dependence results

|	Spain	Switzerland	European Union
Pesaran CD t-stat	3.246547[***]	−0.979462	7.005389[***]

Note: [***]Significant at 1%; [**]Significant at 5%; [*]Significant at level 10%.
Source: Own calculations

There is still a lack of studies of unemployment gender inequality that used the Pesaran CD test and test for cross-dependence as such for this purpose. Gender differences across distinct previous occupations were investigated by Hägglund and Bächmann (2017).
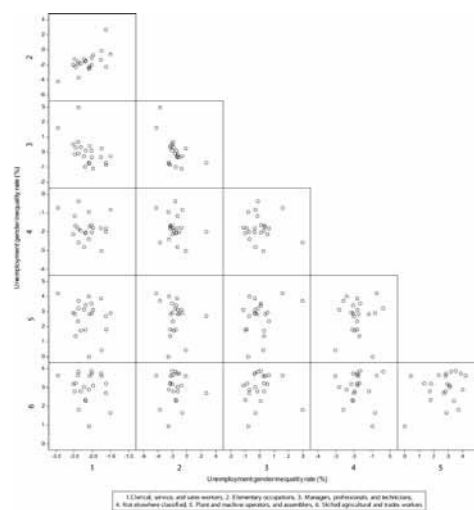
Further, dependence within unemployment gender inequality for each previous occupation of the unemployed in Spain (Figure 11), Switzerland (Figure 12) and the European Union (Figure 13) was displayed. We observe a similar relationship within unemployment gender inequality by distinct previous occupations in Spain and the European Union, while in Switzerland independence was indubitable.

Figure 11. Correlations between gender inequality indicators by previous occupations in Spain
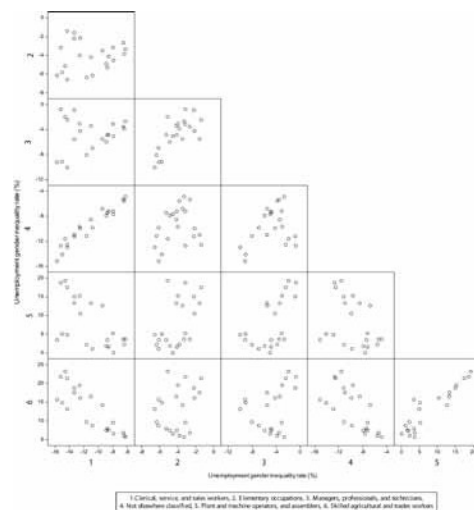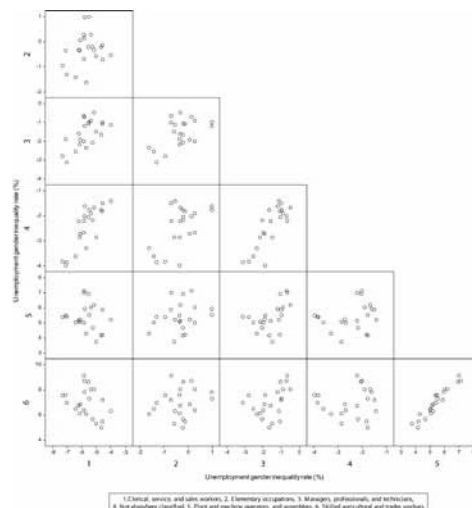

Source: Own calculations

Figure 12. Correlations between gender inequality indicators by previous occupations in Switzerland

Source: Own calculations

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Figure 13. Correlations between gender inequality indicators by previous occupations in the European Union

Source: Own calculations

4.6. Results from Panel Data – Unit Root Tests

When validating the hypothesis of hysteresis on country panel data based on previous occupations, it could not be rejected in the model without breaks for Spain and the European Union, while it was rejected in Switzerland. The panel data behaved as a stationary process only when one or two structural breaks were included (Table 5). Stationarity was proven for all three territories only in the presence of two structural breaks, in both univariate unemployment gender inequality series and in the full panel. The series did not depend on time when we consider economic disturbances that occurred in recent years.

Table 5. Panel LM unit root test statistics

	Without break	With one break	With two breaks
Spain	−0.243	−9.742***	−23.917***
Switzerland	−4.114***	−14.625***	−22.913***
European Union	0.305	−9.595***	−21.179***

Note: ***Significant at 1%; **Significant at 5%; *Significant at level 10%. The 1%, 5%, 10% critical values for the ILT test are −2.326, −1.645 and −1.282.
Source: Own calculations

The obtained results are consistent with the results that were obtained by Bakas and Papapetrou (2014) when validated on gender inequality series and by Wu and Lin (2010) and Khraief, Shahbaz, Heshmati and Azam (2015) when validated on unemployment rate series.

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4.7. Results from Dependency Tests

Gender inequality highly depends on the previous occupation of the unemployed (Table 6). Among the unemployed that previously worked as plant and machine operators, and assemblers, and skilled agricultural and trades workers, men were unemployed more often than women during the whole observed period in Spain, Switzerland and the European Union. Among those that previously worked as managers, professionals and technicians, women were unemployed more often than men during the whole observed period in Spain and the European Union. No women were unemployed who previously worked in the armed forces. Among those that previously worked in elementary occupations, women were unemployed more often than men in all three territories, especially in Spain (100%), but also in Switzerland (95.5%) and the EU (72.7%). In Switzerland, in 54.5% of cases, women who previously worked as managers, professionals and technicians were unemployed. In the European Union and Spain, women were always unemployed more often than men with this previous occupation.

Table 6. Association results

	Territory	Pearson Chi-Square	Cramer's V	Result
Inequality – Occupation	Spain	132.000***	1.000	Strong dependence
	Switzerland	109.013***	0.643	Moderately strong dependence
	European Union	113.456***	0.927	Strong dependence
Level of Inequality – Occupation	Spain	39.710***	0.388	Moderately strong dependence
	Switzerland	49.841***	0.614	Moderately strong dependence
	European Union	133.569***	0.711	Moderately strong dependence
Level of Inequality – Inequality	Spain	9.171***	0.264	Weak dependence
	Switzerland	38.48***	0.540	Moderately strong dependence
	European Union	40.806***	0.556	Moderately strong dependence

Note: ***Significant at 1%; **Significant at 5%; *Significant at level 10%.
Source: Own calculations

Moderately strong dependence between levels of gender inequality and previous occupations was proven in Spain, Switzerland and the European Union (Table 6). The situation in Spain was as follows. Equality was not found. Low inequality was found in 66.7% of the cases of those who previously worked as managers, professionals and technicians. Medium inequality was found in 41.7% of the cases of those that previously worked in elementary occupations. High inequality was found in 20.6% of the cases of those who previously worked as clerical, service, sales workers; in 23.8% of those that previously worked as plant and machine operators, assemblers; in 22.2% of those that previously worked as skilled agricultural and trade workers; and in 19% of those who were never employed before. In Switzerland, low gender inequality was proven in the majority of the cases of those who previously worked as plant and machine operators, and assemblers (34.9%) and skilled agricultural and trades workers (39.5%), and high inequality was proven in 67.4% of cases. In the European Union, the situation was as follows. Equality was not proven. Low inequality was proven among 40.9% of those that were not elsewhere classified. Medium inequality was proven in 81.8% of those that previously worked as clerical, service and sales workers, in 77.3% of those that previously worked as plant and machine operators, and assemblers and in all cases of the

unemployed that previously worked as skilled agricultural and trades workers. Among all unemployed people in the European Union, medium gender inequality was proven in 43.2% of the cases, and high gender inequality was proven in 40.9% of the cases.

Weak dependence in Spain and moderately strong dependence in Switzerland and the European Union was proven between the levels of inequality and those who were unemployed more often, whether men or women (Table 6). In Spain, high inequality was proven for 38.6% of women and medium inequality for 38.6% of women, while high gender inequality that disadvantaged men was proven in 65.9% of cases. In Switzerland, in the majority of cases, high gender inequality that disadvantaged women (76.4%) and low inequality that disadvantaged men (in 63% of the cases) was proven. In the European Union, in 68.4% of cases, medium inequality was proven among men, while among women, high inequality was proven in 88.8% of cases.

5. Conclusion

The paper proposes an indicator for measuring unemployment gender inequality for comparison of unemployment gender inequality across distinct previous occupations of the unemployed. Our approach uses an apparatus of differences of ratios from one, by changing the ratio calculation methodology depending on a higher share of the unemployed on the labour force according to gender. Using this approach, levels of unemployment gender inequality are measured using an interval from -100 to 100, where 0 represents total equality. Therefore values below 0 indicate that the share of unemployed women in the labour force is higher than the share of unemployed men in the labour force, and above 0 that the share of unemployed men in the labour force is higher than the share of unemployed women in the labour force. To provide a better interpretation of the results, values were converted to rates. Using this calibration allows us to measure the severity of the unemployment gender inequality. The highest unemployment gender inequality was found in Spain, which also exhibits very high volatility, while Switzerland exhibits low unemployment gender inequality with low volatility.

When comparing unemployment gender inequality series visually across countries, we note that unemployment gender inequality across distinct previous occupations of the unemployed rarely converges. There is a clear difference between them, and they remain separated during the observed period in Spain and the European Union, although this is not valid for Switzerland. This suggests that in Spain and the European Union, genders are usually very highly associated with how a certain occupation is perceived. For instance, unemployment gender inequality has always been low among those who previously worked as managers, professionals and technicians in Switzerland, while Spain and the European Union gradually developed low unemployment gender inequality in this group over the observed period, even though there are still more women unemployed than men in Spain and Switzerland. Women that previously worked as clerical, service and sales workers were unemployed more often than men during the observed period in all three territories. No common behaviour of the unemployment gender inequality in this group has been found. On the other hand, men that previously worked as skilled agricultural and trade workers were unemployed more often than women in all three territories. Common behaviour of unemployment gender inequality was only found among Spain and the European Union,

while Switzerland exhibited a slight increase since 2000. There is no difference between those who previously worked as plant and machine operators and assemblers in Switzerland. They were considered equal, and inequality was only caused by the seasons. In Spain and the European Union, men with this previous occupation were unemployed more often than women with the same previous occupation, but no common behaviour pattern of unemployment gender inequality was found in any of them. When it comes to elementary occupations, Switzerland exhibits steady albeit low levels of unemployment gender inequality that disadvantages women. Spain almost reached gender equality in this group and the European Union over the observed period switched from disadvantaging women to disadvantaging men that were previously employed in elementary occupations. In Spain and the European Union, no women who previously worked in the armed forces were unemployed, while in Switzerland nobody with this previous occupation was registered as unemployed. Finally, among people that were not elsewhere classified in terms of unemployment, women were more often unemployed than men in all three territories. While this inequality was decreasing in Spain and the European Union, it was volatile in Switzerland.

To explain whether unemployment gender inequality depends on its own historical behaviour or on other factors, such as a policy that could have influence on it, we apply the unit root test, both univariate and panel data, and with and without the option of structural breaks. The results suggest that when allowing for structural breaks, unemployment gender inequality across all previous occupations of the unemployed does not depend on its own historical behaviour but was guided by policy. The same has been proven for unemployment gender inequality with distinct previous occupations in territory panels. Structural breaks only had a temporary effect on most unemployment gender inequality series based on distinct previous occupations of the unemployed. We observe that in most cases structural breaks occurred between 2008 and 2011, which could be associated with the economic crisis that occurred in those years.

Using the Pesaran cross-dependence test, we have proven that the unemployment gender inequality series interacted across distinct previous occupations of the unemployed, in Spain and the European Union, while in Switzerland they were independent. Similar relationships were observed across the series for the European Union and Spain. For example, with the increase of unemployment gender inequality among those who previously worked as plant and machine operators and assemblers, there was also increased unemployment gender inequality among those who previously worked as skilled agricultural and trade workers.

When we categorized unemployment gender inequality based on distinct previous occupations of the unemployed, we discovered that a strong dependence was found between gender inequality and occupations, which confirms that some occupations were perceived as more suitable for women and others as more suitable for men, in all three territories. Moderately strong dependence was also found between levels of inequality and occupations, which suggests that among unemployed with the same previous occupations, one gender was more disadvantaged than the same gender with another previous occupation in which it was also disadvantaged. For example, unemployed women who previously worked as clerical, service and sales workers were much more disadvantaged than the women who were also in disadvantaged but previously worked in elementary occupations. When checked for dependency between the levels of inequality and the gender that was disadvantaged,

moderately strong dependence was proven. This suggests there is a moderate difference between gender inequality regarding which gender was disadvantaged, but gender inequality still tends to be lower when men are disadvantaged.

In conclusion, policy makers in EU countries should focus more on diminishing gender differences across distinct previous occupations of the unemployed, and they should also focus on changing the employees and employer's perception of the nature of certain jobs. While occupations are perceived as female or male occupations, gender equality will not occur in the labour market, and gender inequality will remain persistent. Policies in EU countries should also focus on building skills and directing unemployed women towards occupations for which the labour market is unsaturated.

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