

**Female employment rates
and causality analysis of economic growth**

	Country	Female employment rate
1	Iceland	80.5%
2	Sweden	77.6%
3	Switzerland	77.4%
4	Norway	77.1%
5	Germany	73.1%
...		
32	Turkey	31.6%

- Iceland ranks at the top of the list with 80.5%. Sweden, Switzerland and Norway also show high female employment rates.
- Turkey is at the bottom of the list with 31.6% and has also the largest difference between employment rates by gender.
- Female employment rates are in general lower than male rates across European countries.

Source: eucham.eu/charts

EuCham data based on Eurostat and The World Bank reports
32 European countries were considered for econometric analysis

Detailed Information

EuCham - European Chamber lists the female employment rates and analyzes the causal relationship between female employment and economic growth using a panel data of 32 countries in the period 2006-2014. The result of the econometric analysis shows that bidirectional or unidirectional causalities exist between female employment and economic growth. This means that female employment levels affect economic growth, and vice versa.

Statistics show that the three highest female employment rates in 2014 were in Iceland, Sweden and Switzerland with 80.5%, 77.6% and 77.4% respectively. Turkey lagged far behind Greece and was at the bottom of the list with 31.6%.

According to the OECD Better Life Index, Iceland is the best performing country and at the top of the list in many measures such as jobs and income, above the average in social connections, health status, environmental quality, personal security, education and skills. However, Turkey ranks below the average in all these measures, apart from civic engagement. The most important requirements for finding a job are good education and skills; all these indicators explain why Turkey is at the bottom of the list and Iceland is the top.

Turkey also reveals the biggest difference between employment rates by gender. In contrast, there was almost no difference in employment rates by gender in Finland. In order to achieve a sustainable economy, policies should be developed to increase female employment.

The European Union, in a changing world, aims to maintaining a smart, sustainable and inclusive economy. To reach this purpose, female employment should be more effective in the overall employment rate as mentioned in the European Union's 2020 strategies. In these strategies, it has been highlighted that the female employment rate has increased significantly around the world. However, female and male employment rates have not reached parity in any of the countries observed. Alongside this, equal pay, equality in decision-making, dignity, integrity and gender equality in external actions were also mentioned.

Figure 1: Female employment rate map

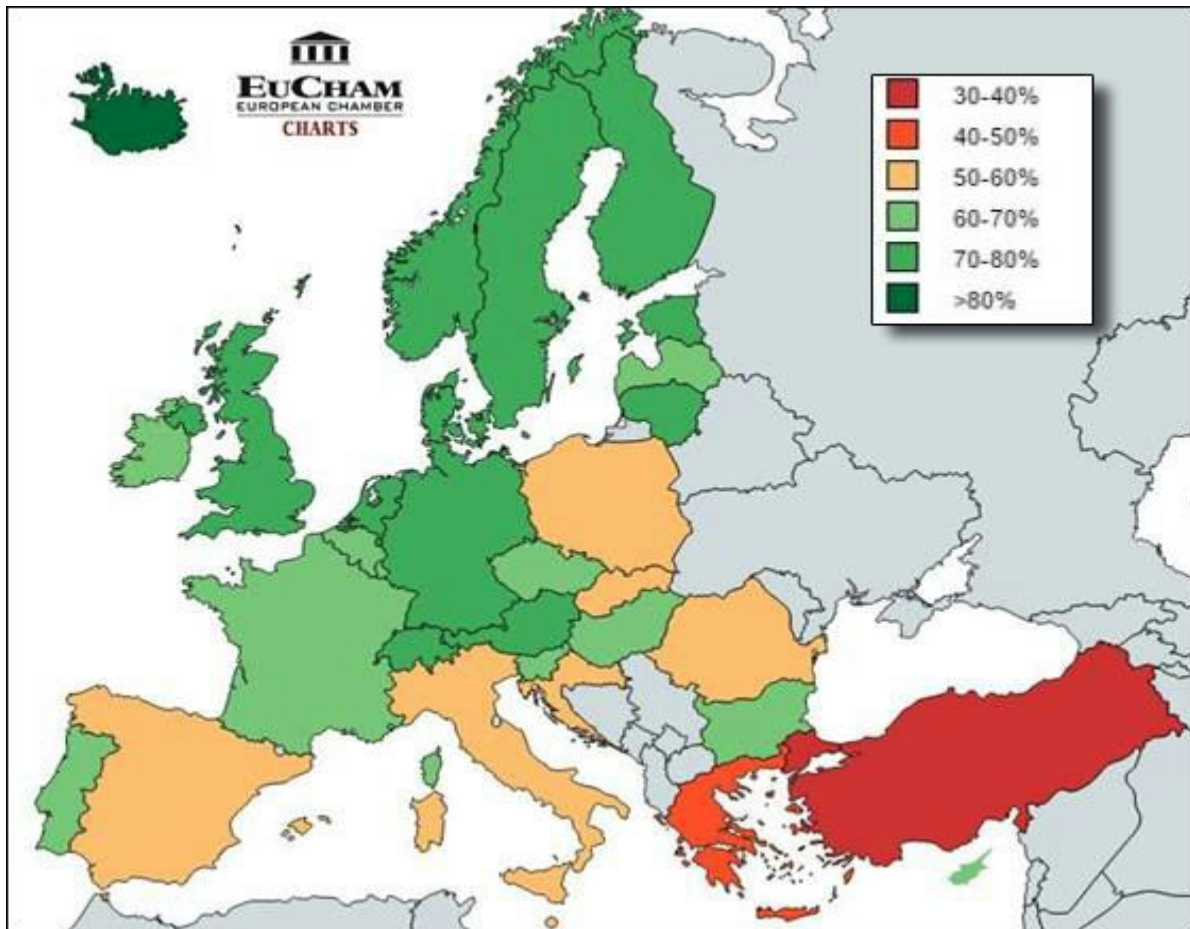


Table 1: Female employment rates in 2014 (%)

	Country	Female employment rate
1	Iceland	80.5
2	Sweden	77.6
3	Switzerland	77.4
4	Norway	77.1
5	Germany	73.1
6	Denmark	72.2
7	Finland	72.1
8	United Kingdom	70.6
9	Estonia	70.6
10	Lithuania	70.6
11	Austria	70.1
12	Netherlands	69.7
13	Latvia	68.5
14	France	66.2
15	Luxembourg	65.5
16	Czech Republic	64.7
17	Portugal	64.2
18	Cyprus	63.9
19	Slovenia	63.6
20	Belgium	62.9
21	Bulgaria	62.0
22	Ireland	61.2
23	Hungary	60.2
24	Poland	59.4
25	Slovakia	58.6
26	Romania	57.3
27	Spain	54.8
28	Croatia	54.2
29	Malta	51.9
30	Italy	50.3
31	Greece	44.3
32	Turkey	31.6

Figure 2: Difference between female and male employment rates in 2014

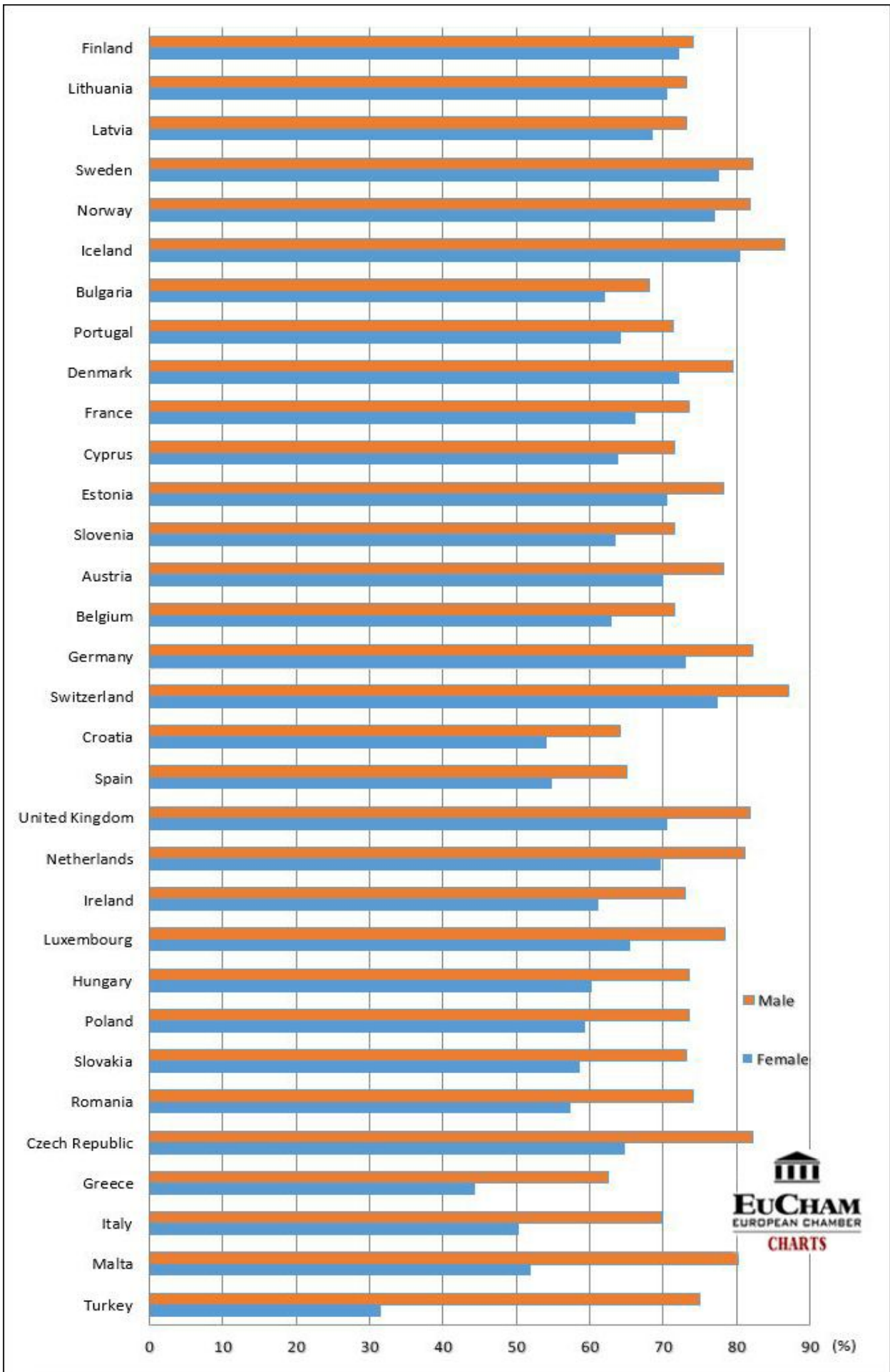


Table 2: Difference between female and male employment rates in 2014

	Country	Female (%)	Male (%)	Difference between rates
1	Finland	72.1	74.0	-1.9
2	Lithuania	70.6	73.1	-2.5
3	Latvia	68.5	73.1	-4.6
4	Sweden	77.6	82.2	-4.6
5	Norway	77.1	81.9	-4.8
6	Iceland	80.5	86.5	-6.0
7	Bulgaria	62.0	68.1	-6.1
8	Portugal	64.2	71.3	-7.1
9	Denmark	72.2	79.5	-7.3
10	France	66.2	73.7	-7.5
11	Cyprus	63.9	71.6	-7.7
12	Estonia	70.6	78.3	-7.7
13	Slovenia	63.6	71.6	-8.0
14	Austria	70.1	78.3	-8.2
15	Belgium	62.9	71.6	-8.7
16	Germany	73.1	82.3	-9.2
17	Switzerland	77.4	87.1	-9.7
18	Croatia	54.2	64.2	-10.0
19	Spain	54.8	65.0	-10.2
20	United Kingdom	70.6	81.9	-11.3
21	Netherlands	69.7	81.1	-11.4
22	Ireland	61.2	73.0	-11.8
23	Luxembourg	65.5	78.4	-12.9
24	Hungary	60.2	73.5	-13.3
25	Poland	59.4	73.6	-14.2
26	Slovakia	58.6	73.2	-14.6
27	Romania	57.3	74.0	-16.7
28	Czech Republic	64.7	82.2	-17.5
29	Greece	44.3	62.6	-18.3
30	Italy	50.3	69.7	-19.4
31	Malta	51.9	80.3	-28.4
32	Turkey	31.6	75.0	-43.4

Methodology

All data are derived from Eurostat and The World Bank. In this paper, the causal relationship between female employment and economic growth (Real GDP) were investigated in three steps using Eviews 7 and Stata 11. Firstly, the Pesaran CDLM test for cross sectional dependence was used, secondly, the Pesaran CADF test was used and thirdly, the Granger causality test was applied after lag order was selected pursuant to information criteria.

There are various tests that analyze cross sectional dependence in panel data. Cross sectional dependence can be identified as a situation in which a shock happens in countries. Such a shock could be an economic crisis that also affects other countries. In this study, the Pesaran CDLM test was used for cross sectional dependence and the test could be used when $N > T$. Number of countries and period of time are defined as N and T . If cross sectional dependence exists between units, second generation tests should be used for successful forecasting. For this purpose, the Pesaran CADF test was used. This is a test that considers cross-sectional dependence and could be used when $N > T$.

Econometric Results

According to the results in the Table 3, cross-sectional dependency was found in both variables. After the cross sectional dependency test, Pesaran CADF was used and results in Table 4 show that the first difference of variables rejects the null hypothesis of a unit root. A unit root can cause difficulties in econometric inference. To illustrate the effect of a unit root, first difference of variables can be considered. To test whether there was a causal relationship among the variables, a panel causality test was performed.

The first difference of variables in the Table 5 shows that bidirectional causalities exist between female employment and economic growth. In other words, female employment levels affect economic growth and economic growth also affects female employment levels.

Table 3: Pesaran CDLM Test

	t statistics	Prob
GDP	49.206	0.0000
Female employment	9.988	0.0000

Table 4: Unit Root Test - Pesaran CADF

Variables	Critical Value			Test Statistics	
	%1	%5	%10	t-bar	p-value
gdp	-2.360	-2.220	-1.902	-1.003	0.158
dgdp	-2.360	-2.160	-2.050	-2.579	0.005
emp	-2.360	-2.160	-2.050	2.433	0.993
demp	-2.360	-2.160	-2.050	-1.840	0.033

dgdp: first difference of gdp
demp: first difference of employment

Table 5: Panel Granger Causality Analysis - Period 2006-2014

Lag: 2 • H_0	Test Statistics	Prob
Female employment does not affect economic growth	9.49233	0.0001
Economic growth does not affect female employment	16.0808	0.0000

Source: Eurostat and The World Bank
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