

## **Woman Employment in Information Economics (An analysis for OECD Members)**

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### **Abstract**

*In recent years, theoretical and empirical contributions to the literature about information economy show the importance of women's employment. In this study, the interaction of information economy and woman employment is tested by panel data analysis. The information economy index, which represents a combined value of computer usage and access to internet, is used. The data of this study include 19 members of OECD for the period of 2000 and 2009. According to the empirical results, there is a statistically significant relationship between information economy and woman employment.*

**Keywords:** Woman employment, information economy, OECD members, panel data.

### **Introduction**

At the end of 1950s and especially after 1990s, increasing level of information usage in developed countries, use of information and technology in production process progressively, growth of computer and automation sector and re-embodiment of the production process is named as new economy or information economy (Powell, and Snellman, 2004: 199). Nowadays, production of information and technology, production processes, trade, logistics and marketing have been changing dramatically. The most important criterion in this change is the level of information and technology used. Economic system created by globalization changes employment circumstances and ratio of labor force (Saygılı, 2003: 5). Information introduces new study areas with the development of communication technologies all around the world. Today, lower need for blue-collar worker comparing with the past, indicates the effect of information economy on employment (Kocacık, 2003:5). Gold-collar workers having high level of information take place of blue-collar workers. This situation leads a change in employment rate and working areas. As the information economy makes variations possible and expands service sector, higher level of female employment rates is expected (Erdem, 2004: 56).

In new economic system created by information economy, elasticity of production processes, work hours and conditions; need for labor force to respond customer's demand and expectations, expansion and variation of service sector will increase the ratio of female employees. Because, portable humanoid office which is introduced by e-technology diversified work life and created the possibility for labor force to work at anywhere at any time. So home life and work life is combined. Consequently, women have the opportunity to work at home beside housework, child care, cooking and cleaning (Curie, and Eveline, 2010: 2). New working areas will decrease the affects of free family workers, level of education, unregistered employment, child care, which are barriers for female employment. Announcement of new working areas on the internet, creating part-time job possibilities, causing new work areas without need of specialization increase the importance of information economy on female employment (Özer, and Biçerli, 2003-2004: 66-67). In this context, the main aim of this study is analyzing the relationship between information economy and female employment of 19 OECD countries between 2000 and 2009.

### **1. Changing Conditions for Women as Labor**

According to the classical economics, economic growth is based on two things: labor supply and the increase in labor productivity. Thus it is essential to increase productivity of labor supply. To increase employment possibilities, especially for new young suppliers, it is necessary to obtain facilities of growing sectors in developed countries (Powell, and Snellman, 2004: 207). After 1990s, especially in USA radical changes in labor market has become more important. Information economy started to effect labors, firms, labor markets and employment policies. First effect was shown with the common use of computers in offices and the need for well-educated labor force.

On the other hand, with the need for employing well-qualified labor, mobility in labor market has increased (Neumark, and Reed, 2004: 3). Parallel to the technological improvements, a new problem has occurred about the demand for and supply of labor force. It is expected that labor force will reach 3.6 billion from 2.4 billion by increasing 50 %. An important part of this rise results from under-developed countries and there exists new job capacity in new working areas. This situation causes an increase in unemployment rate. In under-developed countries, to create new job areas has arisen as a big problem for labor force worked in agriculture previously. Moreover, labor demand necessary for new job areas can not be met, supply and demand disharmony increases in labor market (Alic, 1997: 3). This case explains why production sectors lessen while work areas increase, especially in developed countries. Service sector in OECD countries composes about 50 % and 75 % of employment (Evangelista, and Savona, 2003: 450). This case will affect female labor force supply and will change the ratio of participation of women into labor force. Demand for labor is not the only factor determining female participation into labor force. On the other hand, female labor force participation rate varies from young woman to older ones, from well-educated woman to uneducated ones, and depends on death and birth rate, family structure, ideological structure and education system (Cotter, et.al., 1998: 1676).

Working hours, elasticity of working hours, husband's working hours and age of children are main determinants of women's work life. All these factors are not important for men's labor force supply (Jackson, et.al., 1985: 575). In addition to all these, economic conjuncture is also effective in women's labor supply. During recessions, women labor supply increases (Clausen, and Gilens, 1990: 597). In 1990s, a rise in education level of women had a crucial role in rate of employment increase. Women has left agricultural activities and started to have educations on engineering, mathematic, etc. known as man oriented fields (Jacobs, 1995: 96). This change can be observed in university graduate women in the USA. Teaching, thought as traditional woman job was more than 50 % in 1960, declined under 10 % in 1990 (Özkan, and Özkan, 2010: 92). Nevermore, this case is not enough for new work areas. When information economy-dominated areas are considered, women employment rate is less than 20 % in engineering, 27 % in environment science, 31 % in chemistry, and computer mathematic (Rosenbloom, et.al., 2007: 544).

New economy has important role on participation of married women to labor force by creating part-time job opportunities and making working hours more elastic. Married woman has to conduct business life beside child care and daily housework. Women prefer to have a part-time job until their children reach at school age, and then to have a full-time job. Thus, women are not excluded from labor market during child care period, they get experience for full time job in the future, and they earn money. This is the main reason of increasing part-time jobs and female employment in part-time jobs (Yu, 2002: 494). For example, according to NSCW data in the USA, 24 % of part-time employment consisted of women in 2002. But since part-time jobs are generally low-wage, low status and limited promotion jobs, they are less preferred by women. With high status jobs created by e-technology, this situation is eliminated because high level education is necessary for such jobs (Hill, et.al., 2004: 282). To increase woman employment in new job areas, three phased application is suggested. First stage aims to encourage women to have informatics education, second stage aims to eliminate decrease in women students, and lastly, to meet women with professional business chances (Craig, et.al., 1998: 8).

## **2. Econometric Methodology**

In this study, using the theoretical and empirical background on the subject, an analysis is done in order to see if there is an empirical relationship between woman employment and information economy. The data of 19 OECD countries including Turkey for the period of 2000-2009 were analyzed by making use of panel data econometrics. In this part, panel regression analysis, data set and model is described, and empirical findings are evaluated.

### **2.1. Panel Regression Analysis**

When time series and cross-section data combined together, it is called as panel data. In panel data studies both time and section dimensions handled (Tarı, 2010: 475). In panel data model, classical regression is given by:

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it}$$

$Y_{it}$  shows dependent variable,  $X_{it}$  independent variables,  $\beta$  slope coefficient,  $\varepsilon_{it}$  error term vector and  $\alpha$  constant coefficient. Constant term ( $\alpha$ ) depends on time and cross sections (firm or sector), coefficient of independent variable ( $\beta$ ) only depends on cross sections (Erkan, 2003: 81).

$$Y_{it} = \beta_{1it} + \beta_{2it} X_{2it} + \varepsilon_{it}$$

### **2.2. Data Set and Model**

The following regression is taken into account in order to analyze if there is a long-term relationship between women employment and information economy.

$$WE_{i,t} = \alpha_0 + \alpha_1 IEI_{i,t-1} + u_{i,t}$$

The variables used in this model are WE: Woman employment rate, and IEI: Information economy index, which is calculated for each country as a representative of computer usage, and the access for internet. The data used is of 19 OECD members for the period of 2000-2009.

### 3. Empirical Findings

Empirical findings of the study can be handled in 3 parts, as general statistics of variables, panel regression analysis and panel co-integration analysis, panel causality analysis.

#### 3.1. Panel Regression Analysis

Results of regression analysis are given in Table 1. t values indicates that model is statistically meaningful. There is a positive relationship between woman employment ratio and information economy. Thus, we can say that, changes towards information economy will affect woman employment ratio positively.

**Table-1:** Regression Test Results

Dependent Variable: Woman employment ratio D(WE) Method: Panel data analysis Independent variables: IEI				
Variables	Coefficient	Standard Deviation	t-test	Probability
D(IEI)	17.22247	2.891246	5.956766	0.0000
R-Square	0.664953	Dependent Var method		6.726830
Adjusted R-Square	0.704953	S.D. Depended Variable		10.12587
Regression of S.E.	8.681402	Sum squared residual		1281.235
Total Square	2.647723	J-Statistics		0.209248

The value of R-Square (0,664953) in Table-1 means that independent variable can explain % 66 of change in dependent variable, and F statistics show that the model is meaningful as a whole. Empirical results indicate that there is a positive and statistically significant relationship between woman employment and information economy. The more a country turns to be an information society, the higher the rate of women employed.

#### 3.2. Panel Co-Integration Analysis

Co-integration is a statistical analysis used to investigate if the series in the model act together.

**Table-2:** Johansen-Juselius Co-Integration Test Results

Co-integrated vector	Eigenvalue	Likelihood ratio test	Critical value	Probability
$r \leq 0$	0.679708	28.46477	15.49471	0.0003
$r \leq 1$	0.414843	9.109870	3.841466	0.0025

Co-integration findings given in Table-2 indicate that there is a long-term relationship between series. This result is obtained according to likelihood ratio statistics % 5 table statistics.

#### 3.3. Panel Causality Analysis

When the causality relationship is determined between variables, Granger test is used. The direction of causality is investigated by F test.

**Table-3:** Granger causality test results (Lag: 2)

Direction of relationships	N	F-Statistic	Probability
BEO → KO	17	7.94168	0.00635
KO → BEO	17	4.53352	0.00212

\*Calculated F value;  $F\alpha(m, n-k) = 0,05(2,19) = 3,55$

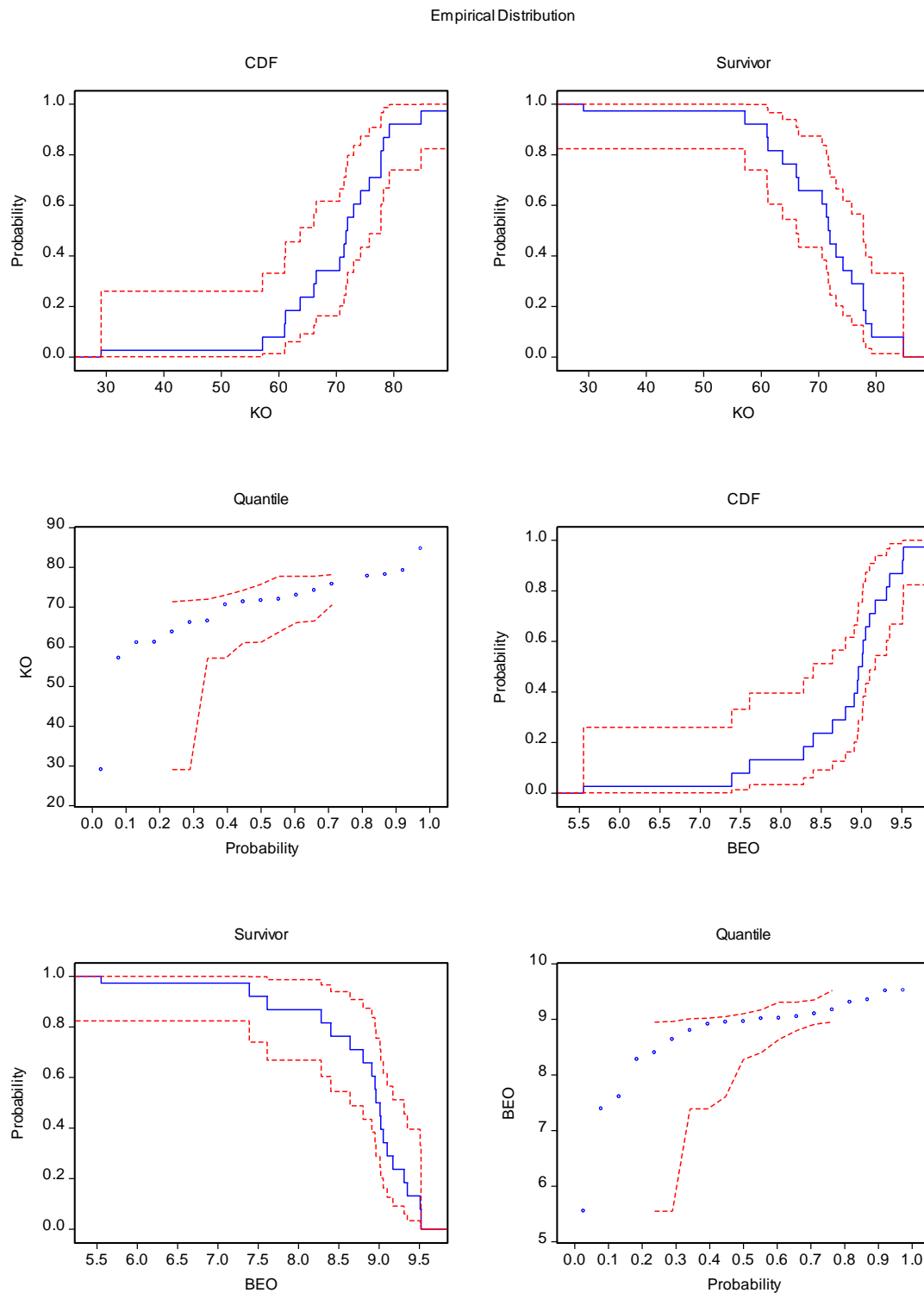
Calculated F value and F value of the table are compared. If calculated value is greater than F value of the table, alternative hypothesis saying that there is causality both from information economy to woman employment and from woman employment to information economy is accepted.

### Conclusion

Women's contribution to labor market is very crucial for a country's economic welfare and development. Another important factor is about how the woman employment located in the information economy. When decline in the woman employment in information economy is considered, it arises as a necessity for government and non-governmental organization to spend more effort on this issue.

In this study, the relationship between information economy and woman employment is handled theoretically in OECD countries and information economy policies are analyzed. Next, regression, co-integration analysis, causality relationship between woman employment and information economy is taken into account. The main aim of this study is to analyze consistency and meaning of empirical findings of woman employment policies for policy makers. When the results of econometric analyses are taken into account, it is seen that there exists a close relationship between information economy and woman employment. In other words, there is causality from information economy to woman employment in long term. As access to internet and usage of computers increase, women’s participation to labor force, and therefore employment opportunities rise. Information economy is desirable not only for general well-being of society, but also for women specifically.

**Figure-1:** The responses of information economy and woman employment when there is standart error in information economy.



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