

## **Use of Spatial Analysis for Woman Participation in labor Market**

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### **ABSTRACT**

The participation of Egyptian women in labor market is the most important issues that occupied an important place recently. In spite of all efforts that made in this framework, it still appears many challenges that impact negatively on the ability of Egyptian women to actively participate in economic life. According to many studies there exist relationships between women's participation in the labor market and some other determinants like Woman's age, level of education for both spouses, place of residence, and number of children of working women and a lot of other factors. This paper is an attempt to make a spatial analysis for women's participation in labor market using one type of spatial data.

There are three general categories of spatial data structure, first is spatial point process data it consists of a set of observed locations in a defined study area. The second type is Geostatistical data which consists of a set of measurements taken a fixed set of locations. Finally, we may observe data from a set of regions partitioning the study area; such data are referred to as Regional data. This paper concentrates on the last type which involves a summary measures for each region such as number of employed or non-employed woman in an enumeration area, average income for women in any region. Here is the question of interest is whether the participation of woman in labor market within a region is the same between all regions or not.

Key words: Spatial data, regional data, generalized linear mixed models, Bayesian approach.

### **1. Introduction**

In the last two decades, the world has showed an obvious interest in the role of women in the family and society as a participant in development as well as men. There are many conferences referred to the need to promote the social status of women and strengthen their role in the political, economic, and social development. The most important conference is the International Conference on Population and Development which concerned with Women's issues, held in Cairo in 1994. It called for women's equal right with men in all areas and the elimination of discrimination against them.

The participation of Egyptian women in the labor force is an important issue that occupied an important place recently. In spite of all efforts that were made in this framework, it still appears that there are many challenges that impact negatively on the ability of Egyptian women to actively participate in economic life. The most important of these

constraints is the low participation of women in the labor force, high unemployment rate among females compared to males where the rate among women are more than three times higher than that among men. The rate is about 24% among women, while it decreases to 6.8% among men. Decline in working conditions for women in the labor force, particularly in the informal private sector and depriving the women of contractual protection, labor rights and benefits are also important problems. Add to that the impact of the double burden on the quality of life for women and their efficiency at work.

According to the review of literature, the research program which carried out by the (Social Research Center, 2009) at the American University entitled "Woman and labor" states that, in spite of all the development efforts to wide the educational base and increasing in health care as well as institutional reforms of laws and regulations that have been made in Egypt in recent decades, which in turn guarantees the rights of women, the participation of women in the labor force is still low, with less than 22% in 2006.

In addition, the participation rate for women which characterized by low contribution in the labor force doesn't reflect in any way any degree of empowerment of women, as the empowerment concept is global, wide and includes woman benefits of choice of freedom as well as the ability to make decisions. In other words, there is a significant difference between the woman's decision to participate in the labor force and her freedom to deal with her income. The problem in Egypt is that the low participation of women in the labor force represents a burden no country can afford, especially a developing country like Egypt, also if it had been taken into account that this low share of woman represents a burden and a high cost (Sakr and Shehata, 2009).

## **2. Importance of the study**

According to many studies there exists a relationship between women's participation in the labor force and some other determinants like woman's age, level of education for both spouses, place of residence, and number of children of a working women and a lot of other factors that would increase or reduce the likelihood of women's participation in the labor force. The labor force survey which is implemented by the Central Agency for Public Mobilization and Statistics (CAPMAS) provides data about work status for women as well as data on demographic, social and economic characteristics. But it is noticeable that the results of this survey do not include any spatial analysis using geographical information systems (GIS). The strength and importance of geographical information system lies in its ability to use spatial and statistical analysis. The first attention to spatial analysis appears in the work of (Moran and Bartlett, 1948). Also (Cressie, 1993) states three important types of spatial data which are: spatial point process data which consisting of a set of observed locations in a defined study area. The locations themselves are considered as the realization of some random process and seek inference regarding the

properties of this process (Ripley, 1977). The second type is geostatistical data which consisting of a set of measurements taken a fixed set of locations, e.g., ozone levels measured at each of a set of monitoring stations. In this case, the locations are set by design and not random. Finally, the regional data which depend on partitioning the study area into regions and involve summary measures for each region such as: number of residents in an enumeration area and average income for residents of the region (Waller and Gotway, 2004).

There are several areas that can be served by GIS. For example, the analysis depends on the factors of time and place to identify new sites (factory, farm, school), and the most appropriate routes between two points, and city planning. There are a lot of studies in this field which appears in the work of (Ghosh and Rao, 1994) also (Rao, 2003). To use GIS there must exist a studied plan, specific targets, and research methodology.

Therefore this study can add the spatial analysis for the results issued by the labor force survey. In addition to that identification of the extent of participation of women in the labor force and constraints that prevent women's participation in the labor force, like social conditions beliefs, gender discrimination between men and women, and lack of information for women about the needs of the labor market or employment opportunities.

Therefore the study will use data of (labor force survey for the years 2011 and 2012) and the data of (census 2006) due to available data on workers and the unemployed, whether male or female.

### **3. Objectives of the study**

- a) Identification of the demographic, social and economic characteristics for working women.
- b) Identification of the demographic, social and economic determinants that have an impact on women's participation in the labor market using data of labor force survey for the years 2011 and 2012 and comparing between urban and rural areas of the Republic.
- c) Using a Poisson Regression Model for women participation in labor force in Upper Egypt.
- d) Identification of the effect of Place of Residence on woman participation in Labor force.
- e) Using spatial analysis Methods according to GIS.

### **4. Methodology of the study**

According to the objectives of the study, the following steps are proposed for the research plan:

- 1) To make analysis of various data of 2011 and 2012 of labor force survey there is a need for cleaning and filtering of data and making cross tabulations.

- 2) Study the correlation between some variables such as age, place of residence, dependency ratio and women's work status.
- 3) Use of a poisson regression model which was first proposed by (Clayton and Kaldor, 1987) to provide estimates for small area, or spatial regression models to build a statistical model. In statistics, poisson regression is a form of regression analysis used to model count data and contingency tables. It assumes the response variable Y has a Poisson distribution, and assumes the logarithm of its expected value can be modeled by a linear combination of unknown parameters. A Poisson regression model is sometimes known as a log-linear model, especially when used to model contingency tables. It's also a generalized linear model with the logarithm as the (canonical) link function, and the Poisson distribution function. Poisson regression model takes the following formula:

$$\log[E(Y_i)] = \log(E_i) + X_i\beta,$$

- 4) Use of some spatial maps to describe regions in Upper Egypt that doesn't have work for women.

### **References**

- 1) Clayton, D. and Kaldor, J., (1987), Empirical Bayes estimates of age-standardized relative risk for use in disease mapping. *Biometrics* 43, 671-681.
- 2) Cressie, N.A.C., (1993), *Statistics for Spatial Data*, Revised Edition, New York: John Wiley and Sons.
- 3) "Census", (2006), Central Agency for Public Mobilization and Statistics (CAPMAS).
- 4) Elhadad, (2009), Low participation of women in the formal labor market and wage discrimination, Social Research Center, AUC.
- 5) "Labor Force survey", (2010, 2011), Central Agency for Public Mobilization and Statistics.
- 6) Lawrence L.Kupper, Keith E.Muller et al., (1998), *Applied Regression Analysis and other Multivariable methods*, 3rd Edition, Thomson.
- 7) Rao, J.N.K., (2003), *Small Area Estimation*, New York: Wiley.
- 8) "Research Program about woman and Labor", (2009), Social Research Center, AUC.
- 9) Sakr and Shehata, (2009), *Woman Empowerment*, Social Research Center, AUC.