

Spatial analysis of the gender gap in employment in the labor market of the Region of Murcia (Spain)

Análise espacial da disparidade de gênero no emprego no mercado de trabalho da Região de Murcia (Espanha)

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ABSTRACT

During the last decades, female participation in the labor market has increased. The decision of women to join the labor market depends, both on social factors such as age, education, marital status, or family conciliation; as well as economic factors such as the real wage. However, this increase in female participation fails to reduce the gender gap. This research, using spatial analysis techniques, tries to identify the explanatory factors of the employment gap in the local labor markets of the Region of Murcia (Spain). The main results are that the differences in the gap are explained by variables such as average age, demographic pressure, and educational level.

Keywords: *Employment Gap, Local Labor Market, Spatial Analysis*

RESUMO

Nas últimas décadas, a participação feminina no mercado de trabalho aumentou. A decisão das mulheres de ingressar no mercado de trabalho depende, tanto de fatores sociais como idade, escolaridade, estado civil ou conciliação familiar; bem como fatores econômicos, como o salário real. No entanto, este aumento da participação feminina não reduz a diferença de gênero. Esta pesquisa, por meio de técnicas de análise espacial, tenta identificar os fatores explicativos da lacuna de emprego nos mercados de trabalho locais da Região de Múrcia (Espanha). Os principais resultados são que as diferenças no gap são explicadas por variáveis como idade média, pressão demográfica e nível educacional.

Palavras-chave: *lacuna de emprego, mercado de trabalho local, análise espacial*

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1 INTRODUCTION

This research aims to analyse the differential factors between men and women in the labor market in the Region of Murcia (Spain). It is intended to spatially identify gender differences and the existence of similar behaviour patterns among neighbouring municipalities in the region.

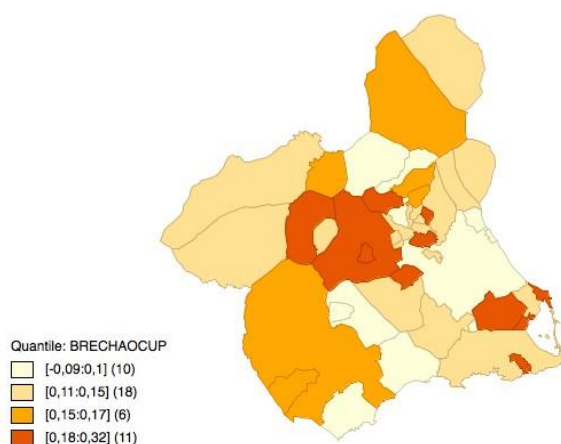
The Spanish working population is getting older and older, so it is necessary to provide resources

for the maintenance of the system (social, health, educational ...). To maintain the system and improve welfare levels, it will be necessary to increase participation in the labor market. Wasting the human capital of a part of the population means losing competitiveness and limiting economic growth (Alonso-Villar and del Río, 2007). For this reason, it is important to reduce the gender gap in employment, to take advantage of this human capital. Knowing the explanatory factors for gender differences would allow the development of social policies aimed at reducing inequalities and allowing female access to the labor market.

During the last decades, female participation in productive activities has increased. Women have progressively been incorporated into the labor market motivated by new job opportunities, by family composition and by the need for higher family income (Nicolás, 2009; Martínez, 2010). Likewise, part-time work has contributed to increasing female employment (Alonso-Villar and del Río, 2007), facilitating access to the labor market. Generally, the increase in women's participation is attributed to a combination of factors: better education, lower fertility, and greater work-life balance (Graaf and Vermeulen, 1997). However, despite the increase in female employment, the employment gap between genders persists.

Figure 2 represents the spatial distribution of the employment gap by gender. The map shows that the distribution is not homogeneous, although there is a concentration of municipalities in the central area of the Region of Murcia that presents high levels of the employment gap.

Figure 2. Quartiles of the employment gap by gender. Region of Murcia, 2011



Source: own elaboration based on the Population and Housing Census 2011

It is complex to identify which are the determinants that cause the differences in the participation of employment by gender between the municipalities of the Region of Murcia. However, we can describe the economic activities developed in the municipalities with the largest and smallest gaps to find explanations for this phenomenon.

The municipalities with the smallest employment gap are Murcia, Santomera, Beniel, Totana,

Aledo, Mazarrón and Águilas. In the municipality of Murcia, due to its condition of administrative capital, the services sector predominates: administrative, health, financial, university and cultural. Furthermore, in the municipality of Murcia, the industrial sector, related to fruit and vegetable production, has increased with the presence of textile, electrical, metal processing, machinery, and construction industries. Another determining factor of expansion and progress in this municipality has been the establishment of large shopping and food centres. Outsourcing and diversification of the productive fabric explain the lower employment gap in the case of the capital city.

The rest of the municipalities have as a common denominator their specialization in the agricultural sector, such as the municipalities of Beniel (predominantly citrus fruits), Totana (horticulture, table grapes and citrus fruits) and Aledo (table grapes). In addition, in Totana there is a certain presence of the manufacturing industry. The municipality of Santomera has four industrial estates whose main activity is the manufacturing industry dedicated to food and beverages, especially citrus fruits. In Mazarrón and Águilas, in recent years, the construction sector and the service sector have increased due to the increase in tourism, although agro-export agriculture continues to be the engine of economic activity. For their part, Cieza and Abarán are two municipalities where agricultural specialization is oriented towards fruit production. In this case, the narrowing of the gender gap can surely be explained by the demand for female labor for certain processes.

The largest employment gap occurs in the municipalities of Cehegín, Mula, Pliego, Ricote, Lorquí, Las Torres de Cotillas, Librilla, San Pedro del Pinatar, Torre Pacheco, Los Alcázares and La Unión. In this case, two groups can be distinguished: one made up of inland municipalities and the other of three coastal ones. The first have as a common denominator agriculture, mainly rainfed, and the agri-food industry. In the coastal municipalities there is an important presence of the construction sector, a predominantly male sector, present in the municipalities of Torre de Cotillas and San Pedro del Pinatar. In the Union, the mechanical products manufacturing industry stands out. Los Alcázares has an industrial estate whose established companies come from the neighboring towns. In Torre Pacheco the activity is mainly related to the agricultural sector and is complemented by the horticultural processing and product marketing industries. However, the greater presence of the immigrant population, mainly male, in these areas may explain why, despite the importance of the agricultural sector, there is no demand for more female labor.

The work is organized as follows: The second section contains a description of the data and the methodology used. The third section presents an overview of the variables that determine employment through scientific review. The empirical results of the spatial autocorrelation tests and the regression analysis are presented in the fourth section. And the fifth section summarizes the main conclusions.

2 METHODOLOGY

For the analysis, the latest data published on occupancy from the 2011 Population and Housing Census in the municipalities of the Region of Murcia are used. Data on gross disposable income of households per capita published by the Murcia Regional Center for Statistics have also been used.

One of the main problems raised in socio-economic analyses is the choice of the geographic unit. Labor markets operate at the regional and not the national level. As Miret and Segarra (2010) say, the geographic unit used plays a determining role in the effectiveness and validity of the analyses carried out and the policies implemented. According to Miedes, Sánchez, Moreno, and Pérez (2006), if the labor market has a pronounced territorial dimension, it may be the appropriate space for the study of phenomena.

A local labor market is a territorial unit, a geographical area, in which most workers reside and work within the same area. It is an area where a significant number of employers and workers adopt their agreements. According to Casado-Díaz et al. (2010), local labor markets are defined as “(a) areas formed by one or more municipalities that are closely linked to each other in terms of mobility, residence-work, (b) which are defined in such a way so that they are very autonomous in relation to each other in terms of said mobility and that, furthermore, (c) they reach a certain minimum size. Local labor markets are defined in such a way that each municipality belongs to one and only one of these markets (it is, therefore, a division that comprehensively covers the Spanish territory, as opposed to, for example, the geography of metropolitan areas and in which, in addition, there are no overlaps)”.

To address the question of whether there is a correlation between male employment rates, female employment rates and the employment gap, we resort to the Moran Index statistic:

$$I = \frac{N}{\sum_i \sum_j w_{ij}} \frac{\sum_i \sum_j w_{ij} (y_i - \bar{y})(y_j - \bar{y})}{\sum_i (y_i - \bar{y})^2}$$

Being w_{ij} the matrix of spatial weights¹, N is the simple size and \bar{y} is the mean or expected value of the y .

Generally, a "queen" structure of the first order² of physical contiguity is applied in the matrix (Larraz and Montero, 2003) where municipalities i, j share a border. However, considering physical contiguity as the sole determinant of regional interdependencies neglects the possible mutual influences between territories that, even though they are far apart, maintain close relationships. But even, there could be problems of spatial heterogeneity such as heteroscedasticity or structural instability. For this reason,

¹The matrix of spatial weights (also called matrix of contacts, matrix of spatial proximity or matrix of contiguity) symbolized with W , is a square matrix of $N \times N$ (where N is the number of spatial units), non-stochastic whose elements (w_{ij}) reflect the intensity of interdependence between each pair of regions i, j (Moreno and Vayá, 2000). The matrix takes values one, $w_{ij} = 1$, for adjacent territorial units and zero, $w_{ij} = 0$, for the opposite cases. Contiguity or neighbourhood can be considered by the “queen” criterion, which means that if any part of the edges or vertices that make up the territorial units’ touch, they are considered as neighbours; or from the “rook” criterion, which requires that an entire edge be common between both units to be considered neighbours.

² The neighbourhood is of order 1 if the units share a common side or vertex with the region of interest, neighbouring municipalities. Other higher-order neighbourhoods would be neighbour’s neighbours.

in this research we propose the use of a hybrid matrix (Barkeley et al., 1995) or perhaps it could be called, by analogy to the unit of analysis it represents, a functional matrix, where the municipalities are neighbours if they belong to an LLM. In other words, two municipalities take a value of 1 if they both belong to the same Local Labor Market (LLM), otherwise, 0. However, we must be cautious with the use of matrices because the spatial autocorrelation indicators are sensitive to the choice of the neighbourhood criterion.

To deepen the analysis of the behaviour of residents, at the local level, it is necessary to resort to a series of Local Indicators of Spatial Association (LISA) that provide information on the degree of concentration of similar values of the variable occupancy rate. The Moran I statistic is applied but not calculated globally for all the observations in the sample, but by subgroups, considering the degree of concentration observed for the values of the occupancy rate.

The estimate of the local Moran's I is:

$$I_i = (y_i - \bar{y}) \sum_j (w_{ij}(y_j - \bar{y}))$$

Being w_{ij} the matrix of spatial weights, N is the simple size and \bar{y} is the mean or expected value of the y .

These indicators will measure the spatial association between the value of the occupancy rate assumed by a municipality and the values assumed by its neighbours, defined through the "functional" contiguity matrix. In such a way that: a) a municipality belonging to an LLM with an occupancy rate value above the average that is surrounded by municipalities belonging to the same LLM with values also above the average, will form a hot cluster or conglomerate ("High-High" values); b) a municipality with a value below the average, surrounded by municipalities of the same LLM with values below the average, will form a cold cluster ("Low-Low" values); c) a municipality with a value above the average, surrounded by municipalities with values below the average will form a cluster with "High-Low" values; and d) a municipality with values below the average and neighbours above will constitute a cluster with "LowHigh" values. It will also determine whether the clusters are significant with different p-level values.

The null hypothesis determines the absence of a spatial pattern. That is, confirming the null hypothesis shows that the employment rate is randomly distributed. And on the contrary, rejecting the null hypothesis means that the occupancy rate exhibits spatial behaviour. The hypothesis is tested by locating the Moran coefficient within a normal-fitted probability curve.

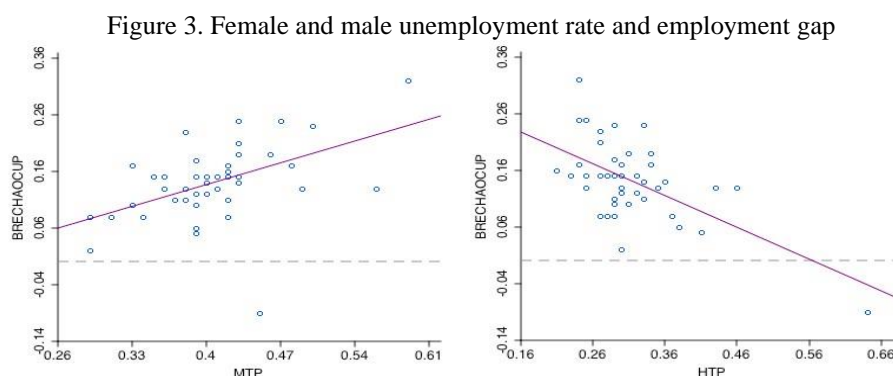
3 DETERMINANTS OF EMPLOYMENT

Some researchers argue that the incorporation of women into the labor market will depend on the woman's own decision. The desire to combine professional life with work would limit access to the labor market. Some theories based on these premises argue that women experience higher rates of abandonment

in the job with respect to men, that women want part-time work, which restricts access to positions of greater responsibility. Becker (1985) points out that women make less effort in the workplace in relation to men because of their greater responsibilities in caring for children and domestic tasks and therefore their salaries are lower and their positions of less responsibility. Other researchers point out higher levels of absenteeism from work, especially due to caring for dependent people, and lower productivity.

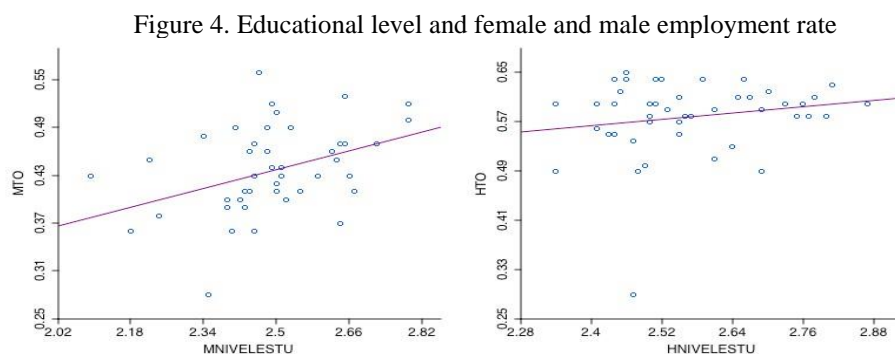
The main determinants that could affect male and female employment rates and the gender gap are explored below.

The unemployment rates. As the female unemployment rate increases, the employment gap increases, while the male relationship is inverse, increases in the unemployment rate reduce the employment gap (figure 3). It may be that men and women compete for jobs or that men or women exert a dejection or aggregation effect.



Source: own elaboration based on data from the Population and Housing Census 2011

Investment in human capital. The research on differences between men and women in the labor market by Alonso-Villar and del Río (2007) reflects the existence of a greater number of women than men with university studies. In addition, these researchers point out that each year there is a greater number of women who graduate from careers related to education, health, the legal-social field and in the humanities and arts, while there is an underrepresentation in technical studies such as engineering or engineering, computing. The employment gap narrows with the level of training (figure 4).

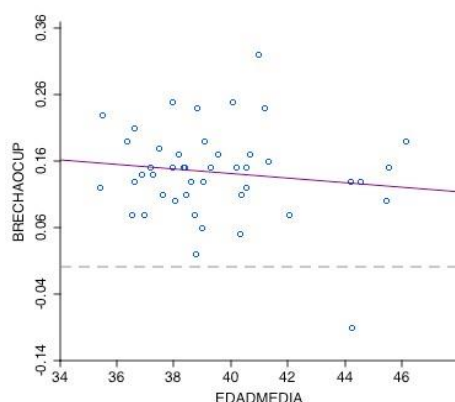


Source: own elaboration based on data from the Population and Housing Census 2011

Women with more education tend to spend more time in the labor market. There is a greater relationship between the educational level and the participation rate of women: as the female educational level increases, the employment rate increases, while the male relationship is less intense.

The Middle Ages. Another variable that could explain the differences in the employment gap is the average age (figure 5). At an older age, the employment gap narrows. Women of childbearing age have lower employment rates

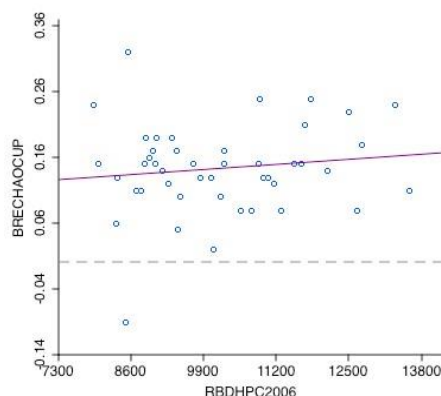
Figure 5. Average age and female and male employment rate



Source: own elaboration based on data from the Population and Housing Census 2011

Disposable income. The increase in real wages of women induces them to participate in the labor market. This variable is related to the level of studies. By acquiring more qualifications, the real wages that can be accessed increase. As we cannot break it down into male and female income, we cannot know what the real effect is.

Figure 6. Gross disposable income per capita and employment gap



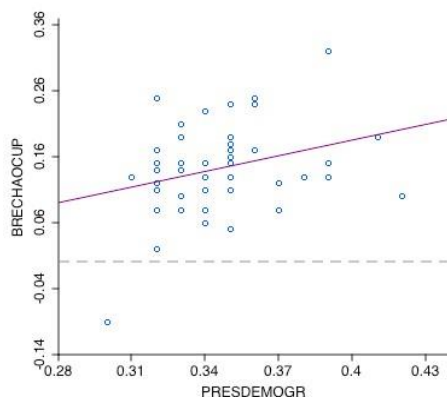
Source: own elaboration based on data from the Population and Housing Census 2011

The gap is reduced in the lowest incomes, probably due to the loss in the levels of quality of life and the need for women to contribute a salary (figure 6) to cover family expenses that are insufficient with those of men. On the other hand, in the face of high incomes, the occupancy gap surely increases

because the family organization can dispense with the income obtained by one of its members.

The demographic pressure. Caring for children and the elderly keeps women apart from the employed population. In this sense, as demographic pressure increases, the employment gap increases (figure 7).

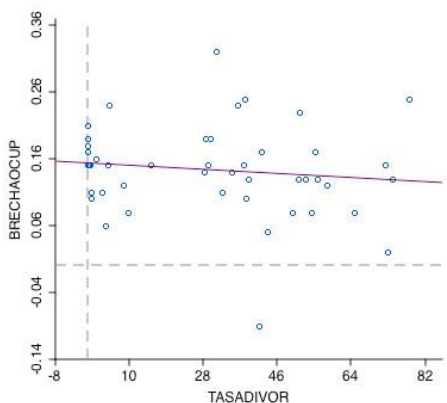
Figure 7. Demographic pressure and employment gap



Source: own elaboration based on data from the Population and Housing Census 2011

The divorce rates. Divorce induces insertion into the job market, either because the child support pension is lower or because of the reduction in the standard of living due to not having the spouse's income. However, the linear relationship is not clear between divorce and participation in the labor market (figure 8).

Figure 8. Divorce rate (per 1,000 inhabitants) and employment gap

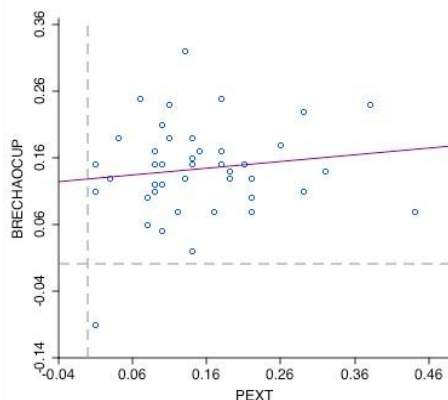


Source: own elaboration based on data from the Population and Housing Census 2011

Investigations determine that one of the causes of divorce has been the change of roles in marriage, mainly due to the participation of women in the labor market. On the other hand, other investigations indicate the scarce existence between the probability of divorce and the independence achieved by women when entering the labor market.

The foreign population. The employment gap increases slightly as the percentage of foreign population increases (figure 9).

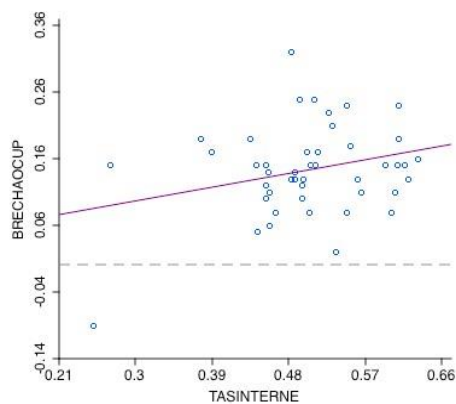
Figure 9. Foreign population and employment gap



Source: own elaboration based on data from the Population and Housing Census 2011

Productivity in housework. The increase in new technologies (washing machines, dishwashers, dryers, etc.) facilitate daily tasks, which means greater availability of time. On the other hand, we observe (figure 10) that as the percentage of internet availability in households increases, the occupancy gap increases. In a more detailed analysis, we identify men as major users of the new information technologies to access the job market.

Figure 10. Internet use and occupation gap



Source: own elaboration based on data from the Population and Housing Census 2011

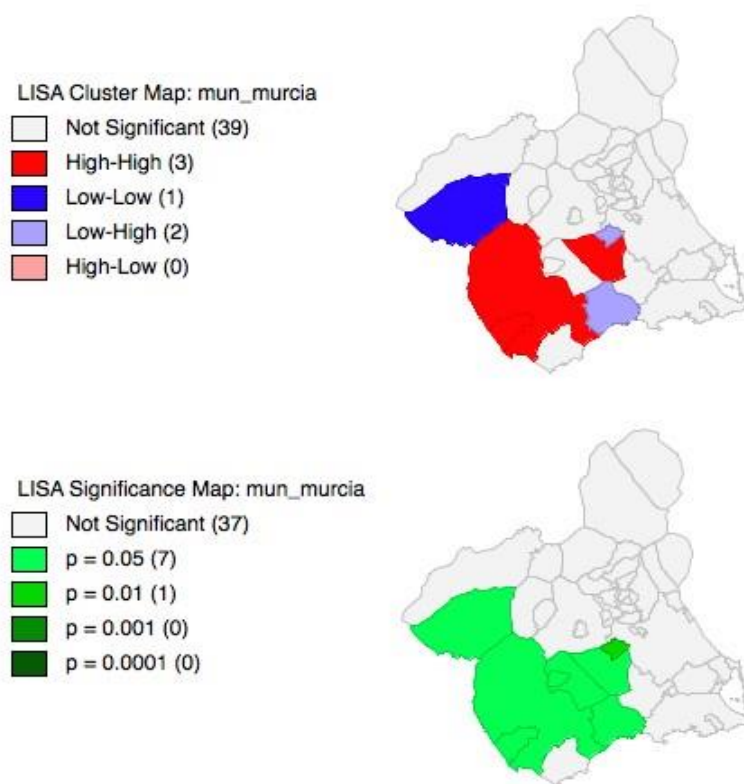
Changes in preferences. The preferences of both men and women change. For example, women value more their independence or their desire for self-fulfilments and on the contrary, men may value more the care of their children.

4 RESULTS

Moran's global indicator of the female employment rate provides us with an insignificant value (0.094814) that determines the scarce existence of global autocorrelation. Therefore, it is convenient to determine the degree of autocorrelation at the local level. In this case we detect the formation of several clusters (figure 11). The most representative is the one formed by high-high values, made up of municipalities belonging to the local southwest employment market: Lorca, Puerto Lumbreras, Aledo, Totana, Alhama de Murcia.

The existence of a concentration in the southwestern market of municipalities with high female employment rates suggests that in this market the municipalities present a homogeneous behavior in which surely women are willing to move to a greater extent than men within the local market of employment.

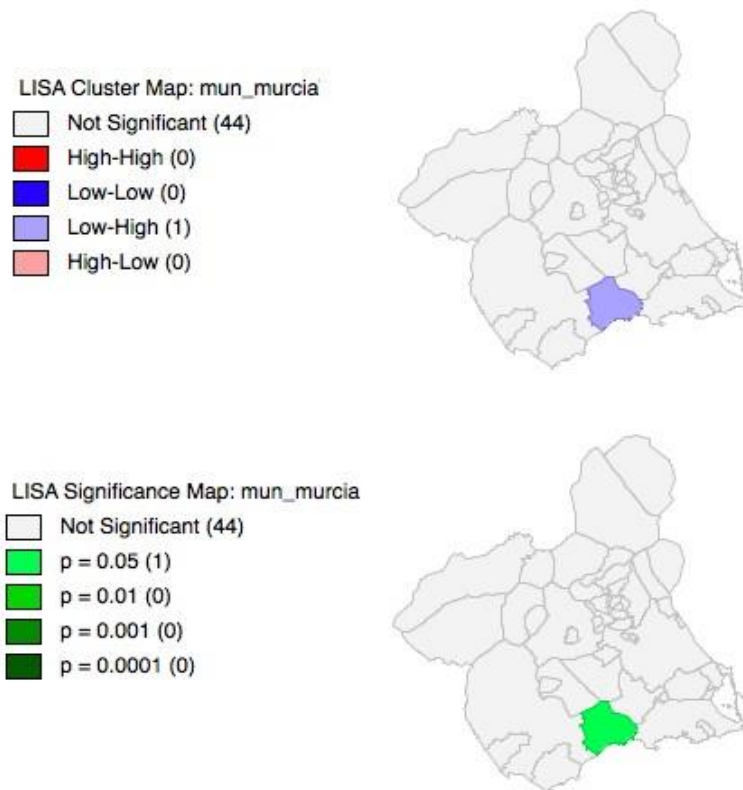
Figure 11. Spatial autocorrelation and significance of the female employment rate. Region of Murcia, 2011



Source: own elaboration based on data from the Population and Housing Census 2011

In the analysis of the global autocorrelation of the male employment rate, the Moran Index (-0.0195635) indicates the non-existence of global male autocorrelation. And deepening the local analysis, we observe (figure 12) that there are no clusters of municipalities with similar values except in the case of Mazarrón, a municipality with low values of male employment rate that are part of the local southwestern employment market that presents values Highest occupancy rate.

Figure 12. Spatial autocorrelation and significance of the male employment rate. Region of Murcia, 2011



Source: own elaboration based on data from the Population and Housing Census 2011

For the dependent variable employment gap, the existence of global or local autocorrelation has not been observed. For this variable, a regression has been carried out by estimating the least squares (Table 3). The purpose of this estimate is to identify which are the determinants that best explain gender differences. In addition, the existence of spatial dependence has been purchased to include the effect in the regressive model. However, the different tests carried out show the non-significance of spatial autocorrelation behaviours and therefore their inclusion in the econometric model is not necessary.

Table 1. Estimation of the least squares in the occupation gap

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REGRESSION. SUMMARY OF OUTPUT: ORDINARY LEAST SQUARES ESTIMATION
Data set      : mun_murcia
Dependent Variable : BRECHAOCUP   Number of Observations: 45
Mean dependent var : 0,142667   Number of Variables : 4
S.D. dependent var : 0,0676067   Degrees of Freedom : 41

R-squared      : 0,408680   F-statistic      : 9,44548
Adjusted R-squared : 0,365413   Prob(F-statistic) : 7,21365e-05
Sum squared residual: 0,121623   Log likelihood    : 69,2014
Sigma-square     : 0,00296641   Akaike info criterion : -130,403
S.E. of regression : 0,0544647   Schwarz criterion  : -123,176
Sigma-square ML   : 0,00270273
S.E of regression ML: 0,0519877
  
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Variable	Coefficient	Std.Error	t-Statistic	Probability
CONSTANT	0,4913569	0,2828737	1,737018	0,0898924
PREDEMOGR	2,020297	0,4308436	4,689164	0,0000303
MEDADMEDIA	-0,01918731	0,004092456	-4,688457	0,0000304
MNIVELESTU	-0,1097128	0,06931838	-1,582737	0,1211656

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REGRESSION DIAGNOSTICS
MULTICOLLINEARITY CONDITION NUMBER 83,590540
TEST ON NORMALITY OF ERRORS
TEST      DF      VALUE      PROB
Jarque-Bera      2      0,941147      0,6246439
  
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DIAGNOSTICS FOR HETEROSKEDASTICITY
RANDOM COEFFICIENTS
TEST      DF      VALUE      PROB
Breusch-Pagan test      3      1,554437      0,6697644
Koenker-Bassett test      3      2,054314      0,5612105
SPECIFICATION ROBUST TEST
TEST      DF      VALUE      PROB
White      9      12,84629      0,1696858
  
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DIAGNOSTICS FOR SPATIAL DEPENDENCE
FOR WEIGHT MATRIX : mun_murciaWF.gal
(row-standardized weights)
TEST      MI/DF      VALUE      PROB
Moran's I (error)      -0,059606      -0,4794138      0,6316443
Lagrange Multiplier (lag)      1      0,3555255      0,5510018
Robust LM (lag)      1      0,1043777      0,7466381
Lagrange Multiplier (error)      1      0,5890240      0,4427968
Robust LM (error)      1      0,3378763      0,5610576
Lagrange Multiplier (SARMA)      2      0,6934018      0,7070168
  
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Source: own elaboration based on data from the Population and Housing Census 2011

After conducting several tests, the explanatory variables that best fit the model have been detected and those that were not significant have been discarded. The linear regression model with $R^2 = 0.408$ presents mean age, demographic pressure, and educational level as explanatory variables. The average age, although with a small correlation coefficient, has an inverse relationship, the older the age, the smaller the employment gap. And on the other hand, the demographic pressure acts in direct relation, the greater the demographic pressure, the greater the employment gap. The spatial component is not included in the model because the different tests performed are not significant.

5 CONCLUSIONS

The participation of women in the labor market depends on both economic and social variables. It is important to know, at the regional level, what are the determining factors of the employment differences between men and women to be able to advance in equality and in the modernization of the labor market.

By viewing the maps that represent municipal employment rates, a clear differentiation between

genders is observed. Municipalities with low rates of male employment do not necessarily have low rates of female employment. To explain the differences in the gender gap in employment rates, explanatory variables that reflect socio-economic characteristics are combined. The results also reflect complex processes of cross-cutting effects between men and women. Some results were as expected: low employment gaps were identified in urban areas; female unemployment rates increase the gender gap; demographic pressure increases the differences between men and women; and the municipalities with a percentage of women with a low educational level had a greater gender gap. However, other results were not as expected: the divorce rate slightly reduces the employment gap, and the percentage of foreign population increases the differences between the sexes.

Female participation in the labor market is a decision compatible with the theory of human capital. Indeed, female investment in human capital reduces the employment gap. Furthermore, the relationship between educational level and employment rate is higher among women than men.

Older women have higher employment rates and the employment gap is also reducing, which suggests that the age of fertility is related to the employment rate, reducing the employment gap among older women (less fertile) . Research would need to be deepened with new data and over several consecutive years to try to identify causal relationships between childcare and female employment rates.

Cross-effects of unemployment were also identified as a function of gender in male and female employment rates. Men and women are not competing for the same jobs, although higher levels of unemployment among men have a positive and significant effect on female employment while higher levels of unemployment among women have a negative effect (worker discouraging). The result between the positive and negative effects widens the gender gap.

The econometric model that best explains the determinants of the employment gap is made up of the explanatory variables mean age, demographic pressure, and educational level. However, only the first two are significant.

It should also be considered that households can choose to live in a municipality with low levels of employment because one of the partners does not want to work. Due to the cross-sectional nature of this research, this issue cannot be addressed in more detail. But for municipal data it is difficult to gather detailed information.

We have not been able to demonstrate, due to lack of data and lack of disaggregation between genders, that women's participation in the labor market is the result of household decisions to increase family income. What we can point out is that as the gross disposable income of households increases, the occupancy gap also increases.

REFERENCES

- ALONSO-VILLAR, O.; DEL RÍO, C. (2007): Diferencias entre mujeres y hombres en el mercado de trabajo: desempleo y salarios. Seminario “Economía e igualdad de Género: retos de la Hacienda Pública en el siglo XXI”, Instituto de Estudios Fiscales, Madrid.
- BARKLEY, D.; HENRY, M.; BAO S.; BROOKS, K. (1995): How functional are economic áreas? Test for intra-regional spatial association using spatial data analysis. *Papers in Regional Science* 74, 297- 316.
- BELTRÁN, J.F.; LOSA, A.; RIQUELME, P.J.; MAGARZO, J.C. (2014): La delimitación de los mercados laborales locales en la Región de Murcia para colectivos en riesgo de exclusión. *Mercados laborales locales y riesgo de exclusión en la Región de Murcia*, 127-158.
- CASADO, J.M.; MARTÍNEZ, L.; FLÓREZ, F. (2010): Los mercados locales de trabajo españoles. Una aplicación del nuevo procedimiento británico. En *Albertos, J.M. y Feria, J.M (ed.) La ciudad metropolitana en España: procesos urbanos en los inicios del siglo XXI. Madrid: Thomson-Civitas*, 275-313.
- LARRAZ, B.; MONTERO, J.M. (2003): Estructura espacial de la tasa de desempleo: una aproximación. *Anales de Economía aplicada, ASEPELT, España*.
- MARTÍNEZ, A. (2010): Determinantes de la participación laboral femenina en Venezuela: aplicación de un modelo probit para el año 2005. *Revista venezolana de estudios de la mujer*, 15 (35), 15-44.
- MARTÍNEZ, J.M.; MARTÍNEZ-CARRASCO, F.; DIOS, R. (2005): La industria de conservas vegetales de la Región de Murcia. Análisis de eficiencia técnica. *Revista de Estudios Regionales* 73, 141-158.
- MIEDES, B.; SÁNCHEZ, C.; MORENO, A.; PÉREZ, G. (2006): Are Local Labour Markets Suitable Space Units In Order To Define Sustainable Territorial Development Strategies? *Papers on Region, Identity and Sustainable Development. International Conference of Territorial Intelligence Alba Iulia*.
- MIRET, L.; SEGARRA, M.V. (2010): El papel de los Mercados Locales Laborales en la aglomeración industrial y cómo las economías externas explican la importancia del territorio. *Tec Empresarial*, 4 (1), 23-31.
- MORENO, R.; VAYÁ, E. (2000): Técnicas econométricas para el tratamiento de datos espaciales: la econometría espacial. *Edicions Universitat de Barcelona*, 36.
- NICOLÁS, C.; LÓPEZ, M.; RIQUELME, P.J. (2009): La segregación ocupacional entre hombres y mujeres: teorías explicativas y análisis de su evolución reciente en España. En http://proyectosocial.unizar.es/n13/N13_03.pdf
- NOBACK, I.; BROESMA, L.; VAN DIJK, J. (2013): Gender-Specific Spatial Interactions on Dutch Regional Labour Markets and the Gender Employment Gap, *Regional Studies*, 47:8, 1299-1312.