

Interrelationship between Economic Activity and Religion

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Abstract

The study uses secondary socio-economic datasets from United Kingdom Census of Population_ casweb and, also micro datasets from the Annual Population Survey _ Office for National Statistics to explore the relationship between selected religious sects and full time employment as a proxy for economic activity in Sheffield, United Kingdom. The results are twofold. Geo-spatial metrics and cluster analysis shows that majority of minority ethnic groups and their associated religion (Muslim and Buddhist) are concentrated in the middle part of the (city centre) of the study area. Secondly, and not surprising, there exist a positive relationship between the majority religion of Christianity and full time employment. On the hand other, there is no significant relationship between the two main minority religious sects (Muslim and Buddhism) and their economic performance in the form of full time employment. The study presents evidence suggesting there is weak positive relationship of Muslim as cluster member relative to Buddhists economic performance in the form of full time employment.

JEL classification numbers:

Keywords: Economic Activity (Full Time Employment), Economic Performance, Geo-spatial distribution and economic development, Regression analysis and Religion.

1 Introduction

The process of globalisation has led to the intensification of certain socio-economic variables. This process thus, has led to the integration of states through increasing contact, communication and trade to create a single global system in which the process of change increasingly binds people together in a common fate [1]. In the broader literature on development and institutions, economists have long taken an interest in the study of religion and economic performance. Socio-cultural variable such as religion is closely related to social capital, culture, and informal institutions and economic performance, growth and development. Section two contains the background to the study. Thus, it

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provides the premise and rationale behind the study. Section three focuses on the broad goal and objectives as it relates to the subject-matter of this study. Section four reviews selected theoretical frameworks inherent in the literature on religion, geo-spatial distribution and economic development. Section five defines the design, data source and applicable methodology to this study. It explains the criteria for selecting the datasets for this analysis. Moreover, it contains a brief on the study area as a case study. Also, it sheds light on the regression model employed as well as the variables used. Section six dwells on the results and analysis and the last section – seven, concludes the study with a summary and recommendations.

2 Background

Religion is seen as having a two-way interaction with political economy. A central question posed by classical writers is to what extent the processes of economic development and political institutions impact and affect religious participation and hence, faith and/or belief systems. Historically, the strand of classical political economy theory originating in the United Kingdom with Petty [2] and, in France with Boisguilbert [3] reaching its pedestal with the seminal work of Smith [4] and Ricardo [5] set the stage for investigation into the relationship between religion and economic development. Although conscious of the landmark achievements of this school of thought, in Karl Marx's [6] estimation the classical school constituted a decisive state in the study of the capitalist mode of production. Religion according to Marx (1867) is used by the ruling class to suppress the working class as they extract what he termed surplus value. Thus, religion was viewed and treated as an independent variable. This has its roots in John Wesley's treatise: *The Use of Money* [7] and, Max Weber's classic work titled: *The Protestant Ethic and the Spirit of Capitalism* [8]. According to this worldview, religion affects economic wellbeing as it fosters traits of trust, honesty, thrift, and hospitality. Noted here is the trust that religious beliefs are what matters for economic outcomes and/or results. The secularisation of religion led to a prediction that it would decline in response to advances in general education and equally important science. The shift is felt more as more people moved away from the vicissitudes of agriculture and toward the greater economic security of advanced and urban centers around the globe. It is argued that the apparent decline of religion is one general manifestation of a broader trend toward modernisation of culture and economies of metropolitan regions (Marx 1859, cited in McCleary and Barro [9]).

The major world religious sects provide different interpretations relative to economic incentives. Such interpretation underlies the mechanism for promoting work effort, wealth accumulation, which then contributes to economic success. The incentive to acquire wealth and material property is limited in Buddhism as the notion of sharing is at the core of its belief system (Gill and Lundsgaarde 2004, cited in McCleary and Barro). Judeo-Christian teachings particularly, Protestantism posits the survival of the soul after death with its emphasis on individual responsibility. Thus, according to Weber (1905) individual Protestants, are religiously compelled to follow a more secular employment with as much enthusiasm as possible. Henceforth, a person with such worldview is more likely to accumulate wealth. Protestantism according to Weber (1905) forbade wasteful use of resources and hard earned money. Rather, one is encouraged to invest his/her money which yields dividends. The Muslim religion on the other hand, creates and encourages a communal enforcement of religiosity. To buttress this point, the Quran, the

holy book of Islam strongly condemns usury. It is considered that those who consume interest cannot stand on the day of the resurrection except one stands as being beaten by Satan into insanity (Quran 276, cited in Zarabozo [10]).

The international migration of peoples and their respective religion and cultures is at the core of the ongoing process of modernisation and globalisation. It is estimated that 3% of the world's population found themselves on an international migration trajectory in 2005 Kahanec and Zimmermann [11]. Migration is not static as it involves many twists and turns. The dynamic nature of migration involve not only important economic and social consequences, but also psychological. These include securing or creating a new employment with higher income and the establishment of new social ties. On the other hand, it involves losing old social ties (social capital)² as well as the psychological costs of missing ones' origin. These are underlying complexities and processes driving and involving migration with its concomitant effects has attracted many and a growing interest of research scientist Chiswick [12/13]; Borjas [14/15].

This brief study highlights the interface and significance of experience in the host community of Sheffield in England, United Kingdom with a focus on the importance of cohort effects, ethnicity, country of origin and more importantly selected minority religious sects and economic activity (full time employment).

3 Goal and Objectives

Being cognisant of the processes and complexity of globalisation and international migration, the broad goal of this study is to investigate and spatially analyse the distribution and participation of minority ethnic groups and associated religions relative to economic activity (full time employment) in Sheffield, United Kingdom. The specific objectives are:

- i. To critically identify and examine the spatial distribution of selected religious sects in Sheffield, United Kingdom;
- ii. To identify the dependent and certain independent factors with their associated correlations that attest to the interface between selected religious sects and economic activity (full time employment) in the national datasets as applicable to the study area; and,
- iii. To identify, examine and explain the best available geospatial analysis techniques available in modelling the associated correlations and interrelationships between selected religious sects and full time employment as a proxy for economic activity.

4 Brief Literature Review

In order to understand the world and appreciate phenomena including spatial patterns and relationships, it's important to provide a brief review of relevant literature related to the subject matter of religion and economic development as part of this study's conceptualisation of the real world. Such review provides a conceptual framework with an added advantage of developing guidelines that allows us to effectively investigate,

²Manohar Pawar, Social Capital? *The Social Science Journal*, 43 (2006), 211-226 (p.222).

analysis in an attempt at finding solutions to human problems at different levels of analysis. To understand liberal market justice, religious orientation and entrepreneurial attitudes, De Nobel, Galbraith, Singh and Stiles [16] hypothesise that individuals with intrinsic religious belief orientation have negative opinions of market exchange. On the other hand, those with extrinsic religious belief orientation do have positive view of the market that propels them to self-employment. The intrinsic measure refers to orientation that emphasise unity and brotherhood Allen and Spilka [17]. In contrast, extrinsic measure emphasise social standing, solace, and endorsement for ones chosen way of life Allport and Ross [18]. The study used cluster membership analysis with a binary dependent variable indicating positive or negative opinions of market justice. They revealed that those with extrinsic orientation had a greater chance of owing their own businesses.

Furthermore, to understand the relationship between religion and economic performance Tu, Bulte and Tan [19] used micro datasets (242 households) to investigate the Yak and Sheep herders in the Tibetan region of China to investigate such a relationship. The dependent variable in this study is household's consumption (proxy for economic performance) that is expenditures excluding spending on house maintenance, health and religion. Explanative variables include religion and ownership of productive assets and human capital. The iteration outcome based on multiple regression analysis showed that the religious input and output were linear as they both entered positively and significantly at the 1 percent level thus, suggesting that both belief system and efforts are associated with higher consumption levels. There was a positive association between herd size and consumption. Moreover, age and education and, consumption on the other hand, posited positive but characterized by diminishing returns. This study shows that religion could not be interpreted as the opium of the people as it has become a component of the Tibetans culture, institutions and hence, serving as a social capital.

In the sub-Saharan African country of Ghana, anthropological studies summarised by Last [20] and Kennedy [21] respectively, indicated that conversion of Islam in the northern parts of the country has been associated with behavioural changes. Sizeable percentage of those sampled becomes self-employed as they established their own businesses. Datasets obtained from household surveys were used to construct data at the regional level. The datasets included such attributes such as schooling, ethnicity, religious affiliation, and population density. Also, monthly data on average and extreme temperatures and precipitation were included in the datasets. Iterations based on simple correlation coefficients revealed statistically significant positive correlations between regional growth and years of schooling; the protestant population share; and the population shares of the two major ethnic groups, the Hausa and the Akan respectively.

To test the robustness' of Weber [22] Protestant work ethic as the basis of western economic growth and development, van Hoorn and Maseland [23] analysed a sample of 150,000 individuals from 82 countries. The dependent variable of interest was individuals' life satisfaction and key independent variables being employment status and religious denomination. Employment status was further subdivided into full-time employment, part-time employment, self-employment, retired, housewife, students, unemployment and other. In accordance with the literature unemployment had a robust, negative effect. Although unemployment reduces well-being regardless of religious denomination, it had an additional negative effect on Protestants of about 40 percent of the original effect. This results is statistically significant ($p < 0.05$). This confirmed the

Weber’s thesis; unemployment hurts Protestants relatively more than it does non-Protestants.

5 Design, Empirical Methodology and Data Requirements

The last few decades have seen increasing attempts to foster collaborative approaches to spatial planning and optimal decision-making at different levels of abstraction and policy making. Geospatial analysis as a sub field of Geo-informatics applies statistical techniques to datasets which have geographical or geo-spatial aspect. Its applications include military and intelligence use, disaster and emergency management, public health, regional and urban planning, forestry and climate science. The interrelationship between human as a species and the environment is a complex process that requires knowledge, skills and information to make decisions. The application of GIS enables us to build such model of the environment that makes it much simpler and easier to understand and hence, make informed decisions and/or educated guess Aronoff [24].

To achieve the goal and objectives of this study, a mixed methods (qualitative _ case study and quantitative _geo-spatial techniques involving regression and cluster analysis) approach is employed. They are intended to supplement each other as both types of methods bear elements of rationality and non-rational influences Pavlovskaya [25]. While geographical boundary map of Sheffield, was acquired from UKBorders: www.edina.ac.uk/UKBorders; socio-economic and datasets on ethnicity, religions and employment were downloaded from UK Census of Population_ casweb [26]. To achieve the objective of investigating and modelling the correlations coefficient to arrive at a summary measure of the robustness’ of the relationships between selected religious sects and full time employment (as a proxy for economic activity), micro datasets from the Annual Population Survey was equally downloaded from the Office for National Statistics [27]: <http://www.ons.gov.uk/ons/index.html>. From the Meta data (pdf) provided by the Office for National Statistics (ONS) code *inecac05* – Economic Activity is re-recorded as:

Table 1: Dependent variable encoding

out of work	0
in work	1

Source: Authors compilation (2013).

This was done to allow for iterations applicable variables in SPSS. Using Excel version 2013 and Statistical Package for the Social Sciences (SPSS) version 20 a rational data base was built. Finally, the rational data-base was joined together with the Sheffield boundary map to create new maps that formed the basis of spatial metrics (cluster member analysis) and non-spatial analysis and recommendations of the subject matter of this study. The procedure and process of joining was done using desktop mapping and analytical software including ArcGIS’s ArcMap 10.

A geo-spatial key technique used to visually depict the variables relating to religion and economic activity in this study is cluster analysis. Henceforth, with the help of radar plot each of the selected religious sects relative to full time employment (proxy for economic activity) serves as dimension over a geographical space. The applicable technique here

dwells on the principle of minimum description length (MDL). Pryor [28] describes this technique as combining the positive value of additional information gained from increasing the number of clusters with negative value of the resulting greater theoretical complexity. Therefore, the sum of these values provides the description length used for determining the optimal number of clusters and one continues to specify more clusters until the description length turns negative (Rissanen 2001, cited in Pryor). A relevant statistic to interpret the results is the unexplained variance of the points, that is, the sum of the scaled variances of a point to the center of its cluster divided by the sum of the scaled variances of a point to the center of the entire sample without taking the clusters into account.³

Furthermore, to model and analyse the relationship between religion and economic activity, the author of this study estimated the following regression equation:

$$\text{Multiple regression: } Y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_p x_{pi} + \varepsilon_i \quad (1)$$

Where: Y_i is full time employment (as a proxy for economic activity) of selected ethnic groups i in Sheffield. The others are the coefficients relating to the p explanatory variables of Interest: Religion = Christianity, Buddhism and Muslim; Ethnicity = Chinese, India and White).

Finally, ε_i is the error term of the equation. In this model, based on the explanations espoused by Tranmer and Elliot [29] simple linear regression

$$Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i \quad (2)$$

can be thought of as special case of multiple linear regression, in which $p=1$.

Similarly, Tranmer and Elliot discuss that the term linear is used because in multiple linear regression we assume that y directly related to a linear combination of the explanatory variables. Ordinary least-squares (OLS) regression, a technique that may be applied to either single or multiple explanatory variables and also categorical explanatory variables is applied. Thus, the line of best fit using the straight line equation

$$Y = \alpha + \beta x \quad (3)$$

as presented in the scatter plots in section six (Results and Analysis) as computed using the OLS procedure. In addition to the model-fit statistics, the R -square statistic is also applied in this model as it provides a measure that indicates the percentage of variation in the response variable (full time employment as a proxy for economic activity) that is explained by the model.

³A scaled distance along a particular dimension takes into account that the various dimensions have different scales. More exactly, the scaled distance is the squared Euclidean distance of a point to the center of its cluster, divided by the variance of all points in the cluster along that dimension to the center of the entire sample. In the calculation of the sum of the variances, the use of scaled distances along all dimensions makes the dimensions commensurable. Pryor, Frederic, L. The Economic Impact of Islam on Developing Countries. *World Development*, 35, (2007) 1815-1835 (p.1821).

Therefore, the R -square equally referred to as the coefficient of multiple determination, is defined as:

$$R^2 = \frac{RSS \text{ after regression}}{Total \text{ RSS}} \quad (4)^4$$

Basically, it gives the percentage of the deviance in the response variable that can be accounted for by adding the explanatory variable into the model. Adjusted R -square which takes into account the number of terms entered into the model and does not necessarily increase as more are added. It is derived using the following equation:

$$R_{\alpha}^2 = \frac{R^2 - k(1 - R^2)}{N - k - 1} \quad (5)$$

Where: n is the number of cases used to construct the model and k is the number of terms in the model excluding the constant (Hutcheson 2011).

Furthermore, iterations involving binary logistic regression is carried out so as to investigate the associations in the multi-way tables where one of the dimensions' of the table in this sense full time employment as a proxy for economic activity is an outcome of interest with two categories religion and ethnicity. Controlling for various explanative variables we set out to explore the interrelationship between religion and full time employment as a proxy for economic activity. Thus, for β each parameter indicates the average change in Y that is associated with a unit change in X whilst controlling for the other explanatory variables in the mode (Hutcheson 2011). SPSS is used to calculate the F - statistic which is equivalent to the t -statistic ($F = \sqrt{t}$) indicating the significance of change in the deviance scores. Using the literature review as a guide, the general analysis of the study was conducted within a theoretical framework of religion and economic development.

5.1 Study Area

The study area is a District within South Yorkshire in England, United Kingdom at latitude 53.3833⁰ north, longitude 1.4667⁰ west _ see Figure 1: Map of Sheffield.

⁴(n.b: RSS _sum of all the squared residuals also known as the sum of squares [RSS], points to a measure of model-fit for an OLS regression model). Hutcheson, G.D. Ordinary Least-Squares Regression. In Moutinho, L. and Hutcheson, G.D. The SAGE Dictionary of Quantitative Management Research, (2011) 224-228 (p. 225).

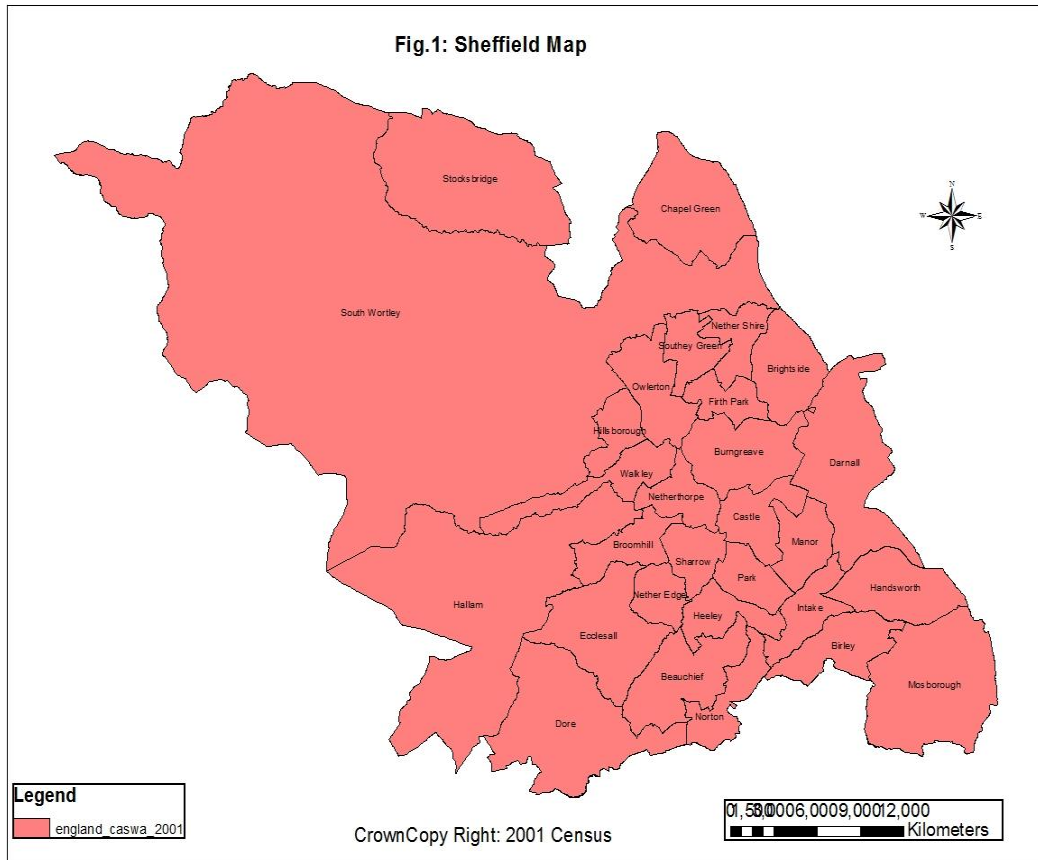


Figure 1: Map of Sheffield

The District of Sheffield like most centers in England, United Kingdom is experiencing the impact of globalisation. A phenomenon that is political, economic, social and cultural de Wenden [29]. It challenges geographical spaces such as Sheffield leading to the emergency of a multiple social networks. Following improvements to indicative migration estimates, total population for Sheffield increased from 552,700 to 555,500 for the year ending 2011. Thus, for the additional 552,700 usual residents, the 2011 census records depicted a further 3,400 non-UK residents in Sheffield. The recorded increase in population since 2001 census is 39,500, 7.7 percent Sheffield City Council [30]

6 Results and Analysis

An initial process involving the exploration of datasets analysis (EDA) is carried out before the regression analysis. This is done as part of the processes of scrutinising and summarising the datasets, and more importantly for model formulation as part of subsequent iterations in regression and cluster analysis. A descriptive statistics showing the total number of cases (N), the mean and standard deviation of variables comprising the dependent value (full time employment as proxy for economic activity) and the explanatory variables religion (Christian, Buddhist and Muslim) as well as Ethnicity (White British, Pakistani and Chinese) is depicted in table 2 __ Descriptive Statistics.

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
% full time	1744	.59	71.59	37.0525	10.13520
% christian	1744	11.14	90.23	69.1351	13.51167
% buddhist	1744	0	8	.21	.570
% muslim	1744	0	75	4.24	9.884
% white british	1744	16.29	100.00	89.7409	13.31470
% pakistani	1744	0	70	2.77	7.538
% chinese	1744	0	20	.40	1.102
Valid N (listwise)	1744				

Source: Authors compilation (2013).

From the above table 2_ descriptive statistics, Christian has a high mean value of 69.1351 with a Standard deviation (SD) of 13.51167; Buddhist has mean of .21 with a SD of .570; and Muslim records a mean value of 4.24 with a SD of 9.884.

To geo-spatially map out economic activity in Sheffield, figures in table 2 were transformed by way of standardisation into Z-scores. This was done to transform the original distribution to one which the mean figures become zero and the standard deviation become 1. This led to the production of table 3_cluster membership of Muslim, Buddhists and Christians.

Table 3: Cluster Membership

	Cluster		
	High Muslim	High Buddhist	High Christian
Zscore: % full time	-1.16233	-.30337	.15001
Zscore: % Christian	-2.32678	-.69400	.31398
Zscore: % Buddhist	-.05111	2.07023	-.32231
Zscore: % muslim	3.09782	.01146	-.27397

Source: Authors compilation (2013).

From the above table 3 _ cluster membership, a radar plot is constructed _ Figure 2: Dependent and Independent Variables.

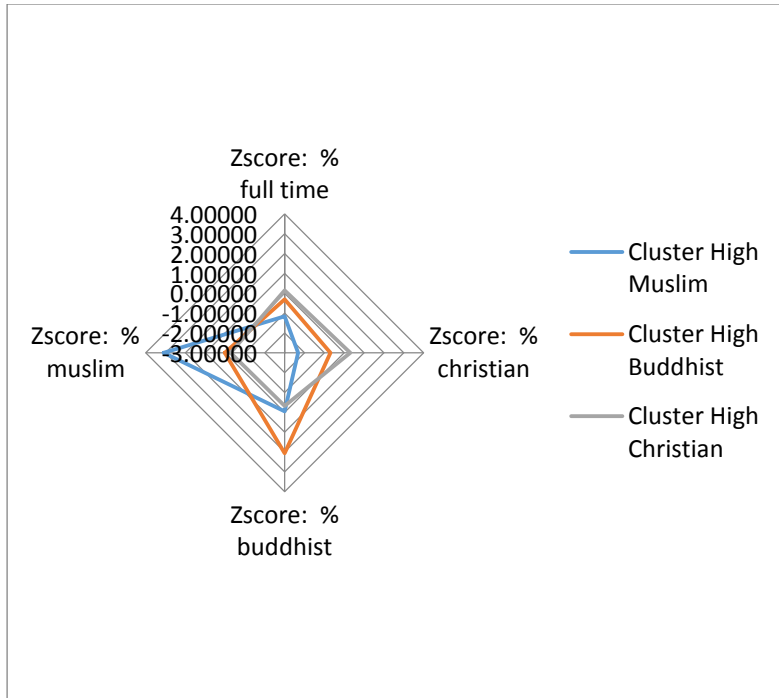


Figure 2: Dependent and Independent Variable

Source: Authors compilation (2013).

The radar plot (Fig. 2: Dependent and Independent Variable) above shows that apart from Christian as a cluster group that occupies the longest distance from the radar’s central point, Muslim as minority religion occupies the second position as compared to Buddhist as cluster group. All three clusters have points higher than the average distance. It’s apparent that in between analysis shows that Buddhist has a higher share of full time employment relative to Muslim as cluster group.

To replicate the results in table 2, a bivariate analysis within a simple linear regression and corresponding scatterplots were generated to illustrate the pattern of correlations for individual religious sects relative to their performance in terms of holding full time employment as a proxy for economic activity (dependent variable) in Sheffield.

Table 4: Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	% christian ^b	.	Enter

a. Dependent Variable: % full time

b. All requested variables entered.

Source: Authors compilation (2013).

Table 4 shows that the dependent variable full time employment and explanatory variable Christian were entered into SPSS as part of the iterations.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.372 ^a	.139	.138	9.40938

a. Predictors: (Constant), % Christian
 Source: Authors compilation (2013).

The table 5 depicts adjusted R square of 13.9% of explained variation in full time employment with the single explanatory variable Christian.

Table 6: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24814.536	1	24814.536	280.275	.000 ^b
	Residual	154230.362	1742	88.536		
	Total	179044.898	1743			

a. Dependent Variable: % full time
 b. Predictors: (Constant), % Christian
 Source: Authors compilation (2013).

Figures in the ANOVA table__6 above shows that the model on the whole is a significant fit to the dataset employed for this study.

Table 7: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	17.746	1.175		15.103	.000
	% christian	.279	.017	.372	16.741	.000

a. Dependent Variable: % full time
 Source: Authors compilation (2013).

Table 7 contains figures depicting the correlation coefficients of the explanatory variable Christian relative to the dependent variable full time employment. The coefficient table shows the following:

- a) The constant, or intercept term for the line of best fit, when x = 0, is 17.746 (%).
- b) The slope for the variable Christian is positive. Thus, this selected religious sect tends to hold more full time employment.
- c) The slope coefficient is .279 with a standard error of .008.
- d) The t value = slope coefficient/standard error = 16.741
- e) This is highly statistically significant (p < 0.005); the usual five (5%) significant level.
- f) The standardised coefficient is .372; thus, a one standard deviation change in the explanatory variable results in 0.372 standard deviation change in the dependent variable (full time employment).

The theoretical model is:

$$\text{Full time} = \beta_0 + \beta_1 \text{Christian P} + \varepsilon_i \quad (6)$$

$$\text{Full time} = \beta_0 + \beta_1 \text{Christian_P}_i$$

Where:

β_0 is the intercept (constant) term and

β_1 is the slope term; the coefficient that relates the value of Christian_ P to the expected value of full time. From this result, an estimated equation is provide:

$$\text{Full time} = 17.746 + 0.279\text{Christian_P}_i$$

Below is a scatterplot showing the relationships inherit in the model _Figure 3: Full time employment as proxy for economic activity.

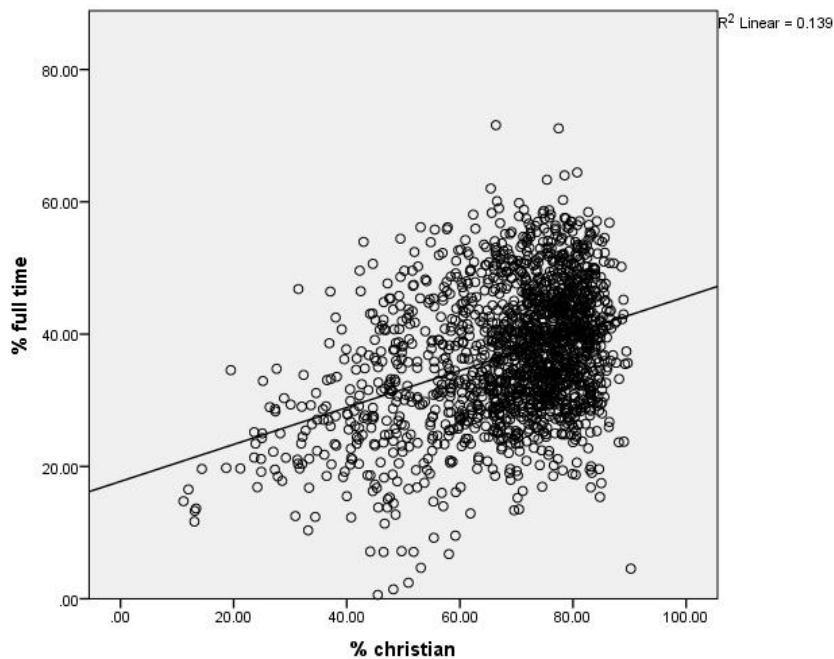


Figure 3: Dependent Variable: Full time employment

Source: Authors compilation (2013).

The graph above (Figure 3: Dependent Variable: Full time employment) shows that there is a strong positive relationship between Christian as an explanatory variable and the dependent variable full time employment.

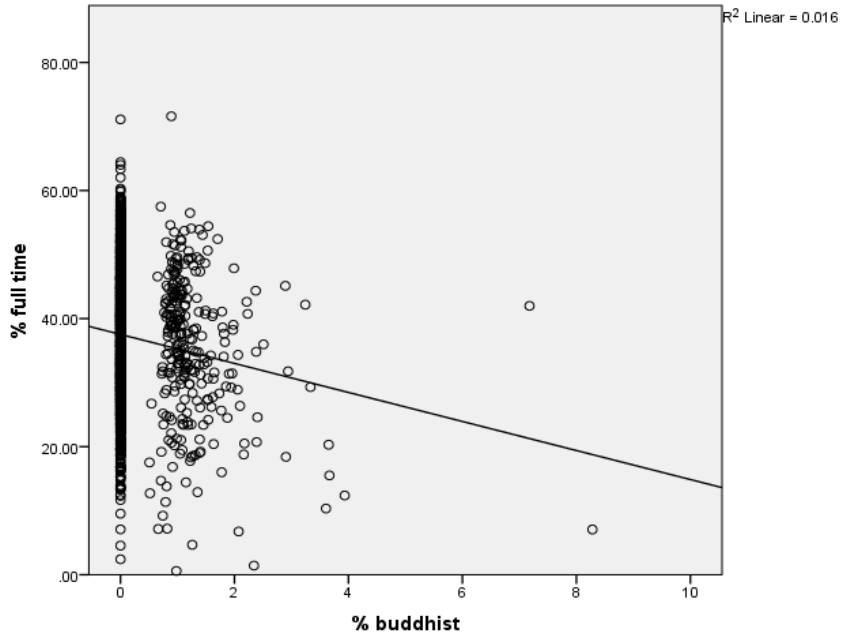


Figure 4: Dependent Variable: Full time employment

Source: Authors compilation (2013).

It is apparent that figure 4 above shows a negative relationship between the independent variable % Buddhist and the dependent variable %full time employment with an *R* square of 0.016. It explains only 1.6% variation in full time employment the dependent variable.

Table 8: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	38.618	.246		156.669	.000
% muslim	-.369	.023	-.360	-16.096	.000

a. Dependent Variable: % full time
Source: Authors compilation (2013).

Table 8 depicts coefficients between variable % muslim and the dependent variable % full time. It clearly shows that the line of best fit when $x = 0$ is 38.618 with a slope of $-.369$. The t value = -16.096 which is statistically insignificant ($p < 0.05$) the usual 5% significance level. Moreover, the standardised coefficient is $-.360$ that is, a one standard deviation change in the explanatory variable results in a $-.360$ change in the dependent variable % full time. These iterations are shown in graph 5_ Dependent Variable: Full time employment.

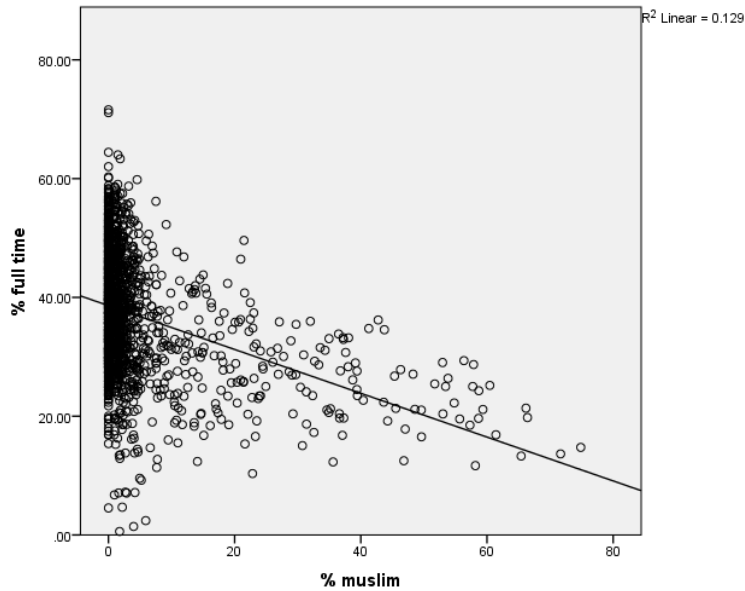


Figure 5: Dependent Variable: Full time employment

Source: Authors compilation (2013).

To enhance the robustness of the model, more explanatory variables are added to form the basis of a multiple linear regression. Table 9 below shows the added independent variables.

Table 9: Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	% chinese, % pakistani, % buddhist, % christian, % white british, % muslim ^b		.Enter

a. Dependent Variable: % full time

b. All requested variables entered.

Source: Authors compilation (2013).

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.447 ^a	.200	.197	9.08179

a. Predictors: (Constant), % chinese, % pakistani, % buddhist, % christian, % white british, % muslim

Source: Authors compilation (2013).

The table 10 depicts adjusted *R* square of 20% of explained variation in full time employment with the multiple explanatory variables % Chinese, % Pakistani % Buddhist % Christian, % white British and % muslim.

Table 11: ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	35778.908	6	5963.151	72.299	.000 ^b
Residual	143265.990	1737	82.479		
Total	179044.898	1743			

a. Dependent Variable: % full time

b. Predictors: (Constant), % chinese, % pakistani, % buddhist, % christian, % white british, % muslim

Source: Authors compilation (2013).

The above table 11 (ANOVA) demonstrates a significant fit to the dataset employment in this study.

Table 12: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-7.248	5.378		-1.348	.178
% muslim	-.020	.105	-.020	-.192	.847
% buddhist	.186	.470	.010	.397	.692
1 % christian	.032	.030	.042	1.061	.289
% white british	.458	.063	.602	7.313	.000
% pakistani	.358	.088	.266	4.077	.000
% chinese	.096	.257	.010	.373	.709

a. Dependent Variable: % full time

Source: Authors compilation (2013).

The table of Coefficients contains both positive and negative figures. Therefore, the theoretical model is formulated as following:

$$\text{Full time}_i = \beta_0 + \beta_1 \text{ muslim}_i + \beta_2 \text{ buddhist}_i + \beta_3 \text{ Christian}_i + \beta_4 \text{ white british}_i + \beta_5 \text{ pakistani}_i + \beta_6 \text{ chinese}_i + \epsilon_i \tag{7}$$

Henceforth, the estimated model is:

$$\text{Full time}_i = -7.248 + -.020 \text{ muslim}_i + .186 \text{ buddhist}_i + .032 \text{ christian}_i + .458 \text{ white british}_i + .358 \text{ pakistani}_i + .096 \beta_6 \text{ chinese}_i \tag{8}$$

The predicated power of the model is diminished as result of the negative intercept (constant) value of -7.248.

Furthermore the micro datasets of religious sects and ethnicity (immigrants) downloaded from the Office for National Statistics (2008) is standardised and changed to Z scores. Using SPSS (Binary Logistic Regression), the intent is to model variables and finally to geo-spatially map it as part of the analysis contained in this study.

Table 14: Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	
Step 1 ^a	migrant(1)	-.132	.012	112.712	1	.000	.876
	religion	.045	00.4	256.017	1	.000	1.054
	Constant	.293	.012	626.820	1	.000	1.341

a. Variable(s) entered on step 1: migrant.

Source: Authors compilation (2013).

The migrant coefficient is statistically insignificant. However Exp(B) is positive; meaning that all things being equal, migrants are .876 times more likely to participate in full time employment. On the other hand, the coefficient of religion is statistically significant (4.5%) as compared to the negative figure for migrant. Based on these figures, the model is:

$$\text{Logit}(\text{full time}) = -.293 + .132\text{migrant}(1) + .045\text{religion}$$

The micro spatial spread by cluster of selected religious sects in Sheffield is visually depicted in Figure 6 _

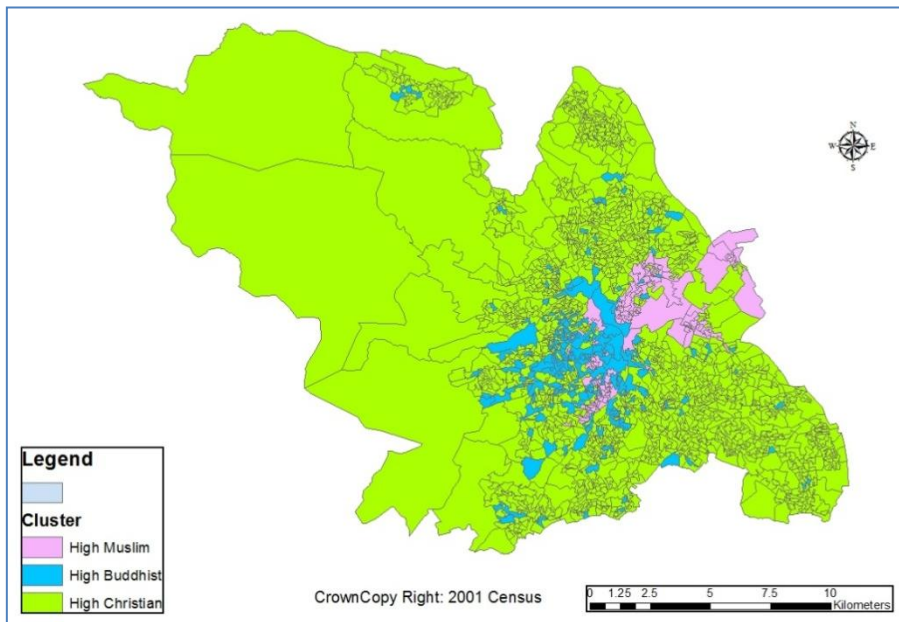


Figure 6: Spatial Distribution by Cluster of Selected Religious Sects in Sheffield.

The micro geo-spatial map shows that whilst Christian is spread throughout the District of Sheffield, Buddhists turn to be concentrated in the middle of the city. Muslims’ on the other hand, is mainly to be located in the eastern part of the District.

7 Conclusion

In conclusion, the study employing geo-spatial techniques of regression and cluster analysis is able to model the correlation coefficients between selected religious sects, ethnicity full time employment as proxy for economic activity in Sheffield. Despite its limitations, the model is seen as first step in an attempt to geo-spatially study the distribution of immigrants and their accompanying religious beliefs as they integrate into Sheffield, in England. Interestingly, the micro representation after the iterations via binary logistic regression gave a better geo-spatial perspective of the interrelationship between religion, ethnicity and economic activity. In view of the theories and explanations espoused in the literature review, this could form the basis of further in-depth investigation into the subject matter of this study.

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