

Measuring and Strengthening Well-being at Regional Level in OECD Countries: Application of the QCA Method

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Abstract

Many factors that influence people's well-being come into play at regional and local level. Therefore, understanding people's levels of well-being at regional level and what determines it where they live is a crucial part of gearing public policies toward better achieving society's objectives. Against this background, this study aims to measure the regions of OECD member countries in terms of regional well-being, using OECD statistics, to discover the configurations of independent policy variables affecting high levels of regional well-being, and to suggest policies for strengthening regions with low levels of regional well-being. In doing this, this study employs the QCA method, which has rarely been used in this academic field. The study results show that there are two sufficient conditions that affect high regional well-being levels. One is the configuration in which Austria and the Netherlands are included, which is formed of a high government expenditure level, a low Gini coefficient, a high national competitiveness level, a low local decentralization level, and a high social cohesion level. Another configuration has a low government expenditure level, a high Gini coefficient, a high national competitiveness level, a low local decentralization level, and a high social cohesion level. New Zealand belongs to this category.

Keywords: well-being, well-being at regional level, QCA, comparative analysis

Introduction

Many factors affecting well-being operate at regional level, not at central level. For example, levels of employment, access to education, and quality of environment vary by region. Differences between regions within a country are as important as differences between countries (OECD, 2013). Recently, there has been a consensus that macro-economic statistics on well-being at national level do not reflect the genuine well-being of people and their aspirations. Accordingly, it is said that there is need for evidence enabling us to explain people's well-being in a variety of areas. From this point of view, in order for us to show the full picture of people's well-being, we need to explain how people think of the region in which they live, how they respond when the region does not meet their needs, and whether access to services influences people's choices of region to live in. In this regard, we can say that investigating regional well-being can contribute toward discovering problems hidden behind

well-being at national level. An overview of well-being at regional level helps regions with low levels of well-being benchmark other regions with high levels of well-being within a country or in other countries. Furthermore, indicators of regional well-being help policymakers and academics evaluate the extent to which regional achievements and performances affect national prosperity and diverse social challenges. Understanding well-being in regions where people live and comprehending what factors determine levels of regional well-being matters to regional policymaking and design at both central and local level, because policymakers can thereby identify which elements are poor in regions with low levels of well-being and what should be done to strengthen them.

In this regard, the OECD (2014) offers a common framework for measuring people's well-being at regional level. The framework has been designed to improve policy coherence and effectiveness by looking at nine dimensions that shape people's material conditions and their quality of life. These nine dimensions derive from both the characteristics of individuals and those of each specific territory. They are best gauged through indicators of real outcomes rather than inputs or outputs. Measuring these nine dimensions through a set of comparable indicators in specific regions of OECD member countries shows that well-being outcomes materialize in very different ways across different locales. Differences in well-being are often greater among different regions within the same country than they are across different countries (OECD, 2014: 15). A more equal distribution of well-being outcome can positively affect people's lives. Many studies (e.g. Birch, et al., 2011; ABS, 2012; Kim and Baek, 2008; Kim et al., 2008; Lee et al., 2005; Lim, 1996; Soh, 1998; Yan, 2008) indicate that regions with lower income inequalities have on average experienced relatively higher growth rates of per capita GDP over the last ten years. However, both average well-being outcomes in regions and their distribution vary significantly, leading us to think that we need to measure both these factors. Against this background, this study aims to measure the regions of OECD member countries in terms of regional well-being, to discover those combinations of variables affecting high levels of regional well-being, and to put forward policy suggestions for strengthening regions with low levels of regional well-being.

Theoretical Discussion and Research Questions

Regional well-being

What a region is needs defining. In geography, regions are areas broadly divided by physical characteristics. As a way of describing spatial areas, the concept of regions is important and widely used among the many branches of geography, each of which can describe areas in regional terms. In this regard, the OECD classifies regions on two territorial levels that reflect the administrative organization of countries (OECD, 2014: 28). OECD large regions (Territorial Level 2, TL2) represent the first administrative tier of sub-national government, for example the Ontario region in Canada. OECD small regions (Territorial Level 3, TL3) are contained within a TL2 region. For example, in France, there are five TL3 regions in the TL2 region of Aquitaine. In most cases, TL3 regions correspond to administrative regions, with the exception of Australia (statistical divisions), Canada (census divisions), Germany (spatial planning regions) and the USA (economic areas). In this study, 'region' is equivalent to a spatial unit corresponding to TL2 used by the OECD, and therefore it means the first administrative tier of sub-national government. At present, the OECD's statistics on regional well-being are based on TL2 regions.

Next, we must examine what constitutes well-being. For the last few decades, concepts of well-being and other analogous terms like 'happiness' and 'quality of life' have drawn attention from psychologist, economists, and other social scientists (Diener, 1984; Diener and Chan, 2011; Diener and Seligman, 2002; Dunn, Aknin, and Naorton, 2008; Easterling, 2003; Kahneman et al., 2004, 2006; Lyubomirsky, Sheldon, and Schkande, 2005; Mogilner, 2010; Van Boven and Gilovich, 2003; Fordyce, 1988; Seligman, 2004; Keyes, 2005; Andrews and Withey, 1976; Campbell et al., 1976; Tanzi and Schuknecht, 1998; UN, 2013; Lippman, 2007). However, there has been no consensus regarding clear definitions of them or the conceptual differences between them (Mogilner et al., 2011: 411; Argyle and Crossland, 1989; Ben-Arieh, 2006; Choi and Moon, 2011; Choi, 2008). The concept of well-being is multi-dimensional and can be divided into two: subjective and objective. Subjective well-being covers a wide range of concepts than just happiness. Although there is no clear consensus on definitions of subjective well-being, it can be defined as good mental states, including all the various evaluations, positive and negative, that people make of their lives and the affective reactions of people to their experiences (OECD, 2013: 10). This definition of subjective well-being encompasses three elements: life evaluation, affect, and eudaimonia. Subjective well-being is considered a separate dimension, measured via life satisfaction.

Unlike this subjective aspect, objective well-being is concerned with the material conditions necessary for quality of life. In terms of an objective well-being framework, the OECD has identified nine dimensions of well-being, encompassing material conditions (income, jobs and housing,) and quality of life (education, health, environment, safety, civic engagement, and access to services). These definitions closely follow those developed in the OECD Better Life Initiative, and reflect the priorities expressed by the countries themselves (OECD, 2014). These are measurements for which internationally comparable indicators have been developed at

sub-national level, and these are objective in nature. Many regional well-being metrics tend to exclude subjective measures because they are considered difficult to interpret in guiding policy, even though others argue that subjective indicators provide insightful and unique information enabling us to evaluate the success of a policy and to select policy goals (OECD, 2014). Ideally, it is necessary to integrate objective and subjective information on well-being in order to measure levels of regional well-being and to strengthen regions with low levels of well-being. However, as mentioned above, the subjective well-being of regions is difficult to measure, because it necessitates opinion surveys of residents, and such surveys are rarely comparable at a level below national values. Therefore, this study is based on objective measures of regional well-being, excluding subjective measures. The OECD presents selected findings on the objective well-being outcomes in OECD member countries by country. According to the OECD Report (2014), regional well-being performance is measured against the nine dimensions – income, jobs, housing, education, health, environment, safety, civic engagement and access to services – shown in Table 1. Table 1 displays the objective level of well-being in Australia according to the OECD Report (2014): that is, the average score of Australia as a nation, as well as the average scores of the top 20 per cent and bottom 20 per cent of regions as displayed in nine dimensions. Using this data, one can obtain a broad understanding of how the objective regional well-being of Australia is distributed through actual regions.

Table 1 also presents information about the values of the top 20 per cent and bottom 20 per cent of regions in terms of nine dimensions.

The disparity issue relating to regional well-being will be discussed in the next section.

Meanwhile, the research by Kee et al. (2014) provides a suggestion for how objective well-being of a region should be measured. This research uses the term 'community' instead of 'region', and presents the components of 'regional well-being'. It adopts a viewpoint from resource and capital and divides regional well-being into six components (Kee et al., 2014: 63). That is, the resource area is broadly subdivided into three – human resources, natural resources, social resources – and this resource area is also divided into six capital areas. Human resources consist of human capital and economic capital, natural resources consist of natural capital and infrastructure capital, and social capital consists of cultural capital and social capital. Each of these capital areas has specific indices. The human capital indices are healthcare, welfare and education, while the economic capital indices are employment, local finances, and the overall local economy. Natural capital includes the surrounding environment. The indices for cultural capital are cultural activities, and those for social capital are citizen participation levels. Additionally, categories for measuring these specific factors are presented in detail (Kee et al., 2014: 61–2). However, in the case of this research, although these data may be sufficient for measuring the well-being level of a single nation, they are limited in terms of their usefulness for comparing various nations.

In the case of research conducted at national level, one point to consider while selecting indices of regional well-being

levels is to ensure that comparison is made between nations. In the case of the research discussed above, the indices are too specific, making them extremely difficult to use in comparing nations. However, the criteria suggested by the OECD Report (2014) involve 9 areas and 11 indices, which makes it easier to use them in national comparisons. Additionally, in the OECD Report (2014), these 9 areas and 11 indices are used to compare OECD nations and thus provide imperfect but valuable information. For these reasons, in this research the data from the OECD Report (2014) on OECD nations will be used for the analysis.

Regional disparities in levels of well-being

It is necessary for a country to enhance levels of regional well-being from both a subjective and an objective point of view. In addition, it is important to maintain regional disparities in levels of well-being along with high levels of well-being in regions. In other words, it is necessary to increase levels of well-being in specific regions, and also to make sure that a country's general level of well-being is shared equally by those living in different regions. Regional disparities have been addressed by governments in several countries through a wide range of policies, including fiscal policies and government relocation policies (Bjørnskov et al., 2008). However, the reality is that variation of regional disparity in well-being varies country by county, depending on the well-being dimension. What really matters is that a country should maintain high levels of regional well-being, and also should ensure that its regional well-being levels are not seriously unequal. However, up until now, not many studies have addressed high levels of regional well-being and indisparsity of regional well-being at the same time. From both an academic and a policy perspective, a nation's simply having a high average level of regional well-being does not ensure that the regional well-being level of that nation is satisfactory, since it is important too for there to be only a small well-being-level gap between its regions. From this point of view, the desirable form of a nation's regional well-being level should satisfy two conditions: First, the average regional well-being level of that nation should be high; and second, the gap between well-being levels in different regions should be small. These two conditions should be satisfied at the same time, yet, up until now research institutes and academics have not produced research mirroring this viewpoint. Against such a background, this research aims to consider both average regional well-being levels and regional well-being differences at the same time. Via this approach, this research seeks to establish which nations satisfy both conditions, and what policy conditions are required in order to become such a nation.

Definition of 'regional well-being' in this research and the factors influencing it

This research combines the discussion results made earlier and divides the definition of regional well-being into two. That is, regional well-being can be split into an objective dimension and a subjective dimension where regional well-being at a subjective level is related to how local residents evaluate their own lives, and in this case includes life evaluation, affect, and eudaimonia. Subjective regional

well-being should be measured via survey, and therefore will be excluded in this research. On the other hand, 'objective well-being' is based on OECD research and thus will be defined as 'a state in which regions sufficiently provide material requirements needed for the quality of life and has a small gap in differences between regions'. From this perspective, as the example presented earlier showed, objective well-being can be defined as a state in which the 9 dimensions and 11 indices from OECD report have high index values and low score differences between regions.

Next is the question 'What is the largest factor that affects regional well-being?', or 'What are the combined configurations of factors that influence regional well-being?' Answering these questions is an important task, involving using the components of regional well-being and applying them to policies. That is, the discovery of the combined condition of the factors influencing regional well-being is a task of the utmost importance in policy planning or execution for regional well-being. Focusing on objective well-being means establishing which policy factors affect objective regional well-being. Although not much previous research has been conducted in this area, one can refer to previous research results relating to policy factors that affect 'national happiness'. For instance, Han (1995), Ha (1996) and Gao et al. (2008) state that economic factors such as per capita GDP, purchasing power parity per capita, government expenditure levels, employment rate, Gini coefficient, and inflation rate affect national happiness. Greve states that factors relating to employment, unemployment and income inequality are the most important in determining national happiness (Greve, 2010: 188). In this context, Greve has conducted an analysis on European nations to ascertain how social policy factors – unemployment budget, employment support budget, income inequality, etc. – can affect happiness. Greve introduces the results of international comparison research conducted by Maarten Berg and Ruut Veenhoven, and mentions that social-policy-supporting factors such as an increase in employment support budgets and unemployment support budgets, as well as factors such as income inequality, that appear as the results of social policies can be included in the policy factors that affect happiness. In theory, various factors may affect happiness, but from a policy perspective the factors that can be controlled through policy are of greater importance. Particularly in the case of well-being at a regional level, regional factors that affect the region should also be analyzed. In order to analyze the factors influencing regional well-being while considering both policy and regional factors, selecting the variables that reflect both factors is necessary. Therefore, in this research government expenditure levels, income inequality levels, national competitiveness levels, local decentralization levels, and social cohesion levels will be selected as factors that affect a nation's objective regional well-being. The government expenditure of a nation is thought to influence regional well-being. 'Government expenditure levels' here means the percentage of government expenditure relative to overall GDP, and it is assumed that the higher this is, the higher regional well-being becomes. Income inequality is also assumed to affect regional well-being, where lower income inequality leads to a higher level of regional well-being. National competitiveness is also assumed to affect

regional well-being (IMD, 2013; World Economic Forum, 2013). Local decentralization can also be an important policy factor, and it is assumed that the higher a nation's local decentralization level is, the higher its regional well-being level becomes (Fukasaku and de Mello, 1998; Zhang and Zou, 1998; Xie et al., 1999). Finally, social cohesion can also become an important policy factor. That is, it is assumed that the higher a nation's social cohesion level, the higher its regional well-being levels become.

Research questions

In this research, two research questions, based on the theoretical grounds of the arguments made earlier, were selected:

1. Which OECD nations have objectively high levels of regional well-being?
2. What are the combined conditions of independent variables that affect high regional well-being levels in OECD nations?

Research Design

Variables

First, in order to address the first research question, the 9 dimensions and 11 indices on regional well-being suggested by the OECD will be used (Table 1). The 9 dimensions consist of safety, health, education, access to services, jobs, housing, income, voters in the last national election, and environment. Of these dimensions, the health dimension and the jobs dimension are made up of two indices. The health dimension is made up of life expectancy at birth and age-adjusted mortality rate (per 1000 people), and the jobs dimension consists of employment rate (%) and unemployment rate (%). The remaining 7 dimensions have one indicator each. Additionally, in order to measure regional differences between regional well-being, average data for the top 20 per cent and bottom 20 per cent of regions are included. The lower the differences between the two groups are, the more balanced regional well-being between different regions can be said to be.

As regards the second research question, in order to discover the combined conditions of policy factors that affect regional well-being, 5 individual variables were selected. These individual variables are government expenditure levels, income inequality levels, national competitiveness levels, local decentralization levels, and social cohesion levels. A QCA analysis will be conducted utilizing these independent variables. Standards for selecting the thresholds are various, and include theoretical standards, average and median. In reality, since it is difficult to set a theoretical standard, averages or medians are used. In this research, a median will be used. If the value is larger than the median the score is 1, and if smaller than the median the score is 0.

Methodology

Standardized Z score

This research selected two research questions, and thus two research methods will be used for addressing them. In order to measure the regional well-being levels of OECD nations, a Z

score (standardization score) will be used, by standardizing the 9 dimensional scores categorized by the OECD. The 11 indices have different measuring units, and thus there is a need for standardization. The Z scores for each of the 9 categories are added and then divided by 9, which will serve as the overall well-being level value. However, since the health and job dimensions have 2 indices each, in this case the average of 2 indices was used. Also, there are cases when the indices point in different directions. For example, employment rate should be high, while unemployment rate should be low. In consideration of such characteristics, for indices such as unemployment, where a high value is bad, the values are standardized, multiplied by -1 and then dealt equally as normal indices.

In measuring the regional disparity score for each nation, the difference between the top 20 region scores and the bottom 20 region scores was calculated and a Z score based on this was recalculated. However, since this Z score on category differences is used to display the differences between regions, a lower score is a more desirable state. Therefore, this score was also multiplied by -1, so as to deal equally with indices headed in different directions. Overall, by using the median of the total regional well-being scores and the median of regional balance level scores, all nations were categorized into four quadrants. Of these four categories, nations with a high regional well-being score and a satisfactory regional balance were marked 1, and all other categories (i.e. nations with a high well-being score but an unsatisfactory regional balance, nations with a low well-being score but a satisfactory regional balance, and nations with a low well-being score and an unsatisfactory regional balance) were marked 0.

Qualitative Comparative Analysis (QCA)

Next, the various combined conditions that affect the well-being of each nation were figured out. For this, Qualitative Comparative Analysis (QCA) was used. QCA is a comparative technique (Vink and Van Vliet, 2009) that is used to explain large social events concisely by using a small number of cases (5–55). Although QCA does not provide statistical results for generalization, it is a useful method that categorizes cases by their characteristics in a simple manner (Luck et al, 2006; Poveda, 2013; Rihoux, 2006). QCA, developed by Ragin (1987), has not provoked much interest until now. The main purpose of this method is to provide meaningful and concise interpretations on the causal patterns of the cases that are examined. This method aims to find the various causal conditions or condition factors that can fundamentally affect the result. That is, it begins with the assumption that one outcome does not belong to a set of one variable, but can belong to a set of many variables (Wagner and Shneider, 2010; Rihoux, 2006). Other characteristics of this methodology are the use of set theory, Boolean algebra, its formation of a truth table, and a concise approach to research data (Donnelly and Wiechula, 2013). The QCA method is of three broad kinds: crisp set QCA (CSQCA), fuzzy set QCA (FSQCA), and multi-value QCA (MVQCA). This research will use CSQCA, since this method processes data by changing independent variables and dependent variables into 0 or 1 according to a certain threshold. It is more convenient to set a threshold and categorize the

independent values that affect the regional well-being score of nations included in this research into 0 and 1. This research will use the CSQCA program and the TOSMANA program.

Analysis subjects

The analysis subjects of this research are the 34 OECD nations. The data used to resolve the first research question are derived from *How's Life in Your Region?* (2014) published by the OECD. This report contains data on 31 of the 34 OECD nations, it being difficult to obtain data for the other three (the USA, Iceland, Luxembourg). Therefore, the national data on the 31 nations covered in the Report will be used for regional well-being measurement. However, for analysis of the combination of conditions that affect regional well-being, five policy variables will be used. Owing to problems relating to data collection, 28 nations will be included.

Analysis

Regional well-being of OECD nations at a regional level

The standardized regional well-being level of OECD nations on each of the 9 dimensions and its average value (*zwellbeing*) are presented. That is, since the scores of the 9 dimensions have different measurement units, the standardized scores are calculated for each of the 9 dimensions. The sum of these values is divided by 9, which is the *zwellbeing* value. The standardized score is calculated from the following equation –

$$z = (X - \text{Mean}) / s.d$$

where X stands for the actual value, Mean stands for the average value, and s.d stands for standard deviation.

As Table 3 shows, the regional well-being levels of the OECD nations in 9 dimensions, and the average score of these values, the *zwellbeing* value, are presented. The z in front of the variable names indicates that it is a standardized value. A high *zwellbeing* value indicates a high regional well-being level, and this value is the average of the standardized regional well-being scores of the 9 dimensions.

Meanwhile, Table 4 presents the values of policy factors that affect regional well-being, the *zwellbeing* value and the *zdisparity* value. The *zdisparity* value here is calculated by subtracting the value of the bottom 20 per cent of regions from that of the top 20 per cent, standardizing these values again, and multiplying it by -1. The reason -1 was multiplied is that a large difference value indicates strong regional disparity. A large *zdisparity* value indicates low regional disparity, and a low value indicates severe regional disparity in regional well-being.

The *zdisparity* value reflects regional disparity of nations in terms of wellbeing. Figure 1 situates nations according to the two criteria seen above – well-being values and regional disparity levels – on a quadrant.

Figure 1 is the result of situating OECD nations according to a regional well-being perspective by combining the well-being and regional disparity concepts. Nations situated on the first quadrant are seen as those with high regional well-being

levels. Nations in this quadrant have both high well-being levels and low regional disparity. The 9 nations included in the first quadrant are Austria, Belgium, Denmark, Germany, the Netherlands, New Zealand, Norway, Sweden, and Switzerland. These nations satisfy the concept of regional well-being defined in this research. That is, they have high well-being levels and regional development levels, owing to low regional disparity. Figure 2 offers a graphical representation of this.

wellbeing ↓ disparity ↑		wellbeing ↑ disparity ↑	
6	Czech Re	2	Austria
12	Greece	3	Belgium
13	Hungary	7	Denmark
14	Ireland	11	Germany
25	Slovak R	20	Netherlands
26	Slovenia	21	New Zealand
		22	Norway
		28	Sweden
		29	Switzerland
wellbeing ↓ disparity ↓		wellbeing ↑ disparity ↓	
5	Chile	1	Australia
8	Estonia	4	Canada
15	Israel	9	Finland
16	Italy	10	France
18	Korea	17	Japan
19	Mexico	31	United Kingdom
23	Poland		
24	Portugal		
27	Spain		
30	Turkey		

Figure 1: Classification of nations by regional well-being and regional disparity

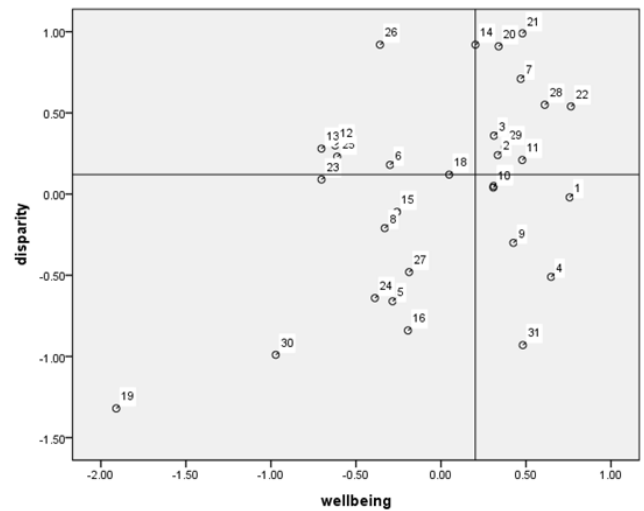


Figure 2: Classification of nations according to well-being and regional disparity standards

Combinations of conditions that affect regional well-being levels

The next element that must be considered is which combined conditions of variables lead to high regional well-being levels. As was mentioned above, nations with a high well-being level

and low regional disparity are seen as having a high level of regional well-being. That is, knowing the combined conditions of the 9 nations belonging to the first quadrant of Figure 2 is important for analysis.

Table 5 presents the results of the 5 independent variables represented as 1 or 0. For instance, govexpend_1 is the result of classifying OECD nations according to their government expenditure values, where nations with a value higher than 44.35, the median, are assigned 1, and other nations are assigned 0. This is the same for other variables. The classification standards according to the median of individual variables are cited in Table 2. Afterwards, a QCA analysis was conducted employing these values by using TOSMANA 1.3. The product of a QCA analysis is a truth table research result. The truth table research result shows that there are in total 2 types of combined conditions that lead to a high level of regional well-being.

Note. Variables starting with a large capital letter have a positive meaning or a value of 1, and those starting with a small capital letter have a negative meaning or a value of 0. In a truth table produced using the TOSMANA 1.3 program, various conditions can be compared against each other, and ideally against an outcome, a high level of regional well-being. The Venn diagrams presented in Figure 3 illustrate the logical relationships between conditions. Each space in a diagram can be color coded, shaded or patterned. Figure 3 is a graphical depiction of the configurations from the truth values presented in Table 5, and was produced by TOSMANA 1.3's 'visualizer' tool.

As the truth table analysis results indicate, there are 2 sufficient conditions that affect a high regional well-being level. One is the configuration in which Austria and the Netherlands are included, which is formed of a high government expenditure level, a low Gini coefficient, a high national competitiveness level, a low local decentralization level, and a high social cohesion level. Another configuration has a low government expenditure level, a high Gini coefficient, a high national competitiveness level, a low local decentralization level, and a high social cohesion level. New Zealand belongs to this category.

Other configurations either lead to a low regional well-being level or display as contradictory. For example, in the configuration to which Australia, Canada, Ireland and Switzerland belong, the output is displayed as c (contradictory). This is because some nations having this configuration are seen as having a high level of regional well-being (Australia, Switzerland) and others (Ireland, Canada) a low level. Figure 3 presents these results in the form of a Venn diagram. In the diagram, [1], or a positive outcome, is shaded green, [0], or a negative outcome, is shaded lilac, and [C], or contradictory configurations, is patterned with green and lilac stripes. Contradictory configurations occur in cases where some combinations of conditions result in a [0] outcome, but others result in a [1] outcome (Wiechula, 2012). Blank white spaces are logical remainders [R], or combinations of conditions that have not been observed. For example, in the lower left space the

notation 01001 highlights the absence of any combination of conditions associated with a positive outcome.

As Figure 3 shows, there are two combinational forms of variables that lead to an output value of 1 or a positive regional well-being level. These two combinations are:

$$\text{GOVEXPEND}_1 * \text{gini}_1 * \text{COMPET}_1 * \text{decen}_1 * \text{COHESION}_1 + \text{govexpend}_1 * \text{GINI}_1 * \text{COMPET}_1 * \text{decen}_1 * \text{COHESION}_1$$

The * sign between variables stands for an 'and' in set theory and the + stands for an 'or'. That is, there are two sufficient conditions for becoming a nation with a high level of regional well-being. One condition consists of a high government expenditure level, a low Gini coefficient, a high national competitiveness level, a low local decentralization level and a high social cohesion level. The other consists of a low government expenditure level, a high Gini coefficient, a high national competitiveness level, a low local decentralization level and a high social cohesion level. The policy implication deriving from these analysis results is that nations with low regional well-being levels should, in order to raise them, select the configuration that is closest to their own. That is, since these two conditions are sufficient to produce a nation with a high level of regional well-being, by fulfilling either of these conditions a given nation can attain a high level of regional well-being. These implications cannot be derived via analysis methods such as regression analysis, and so the ability to derive them can be seen an advantage of the QCA method.

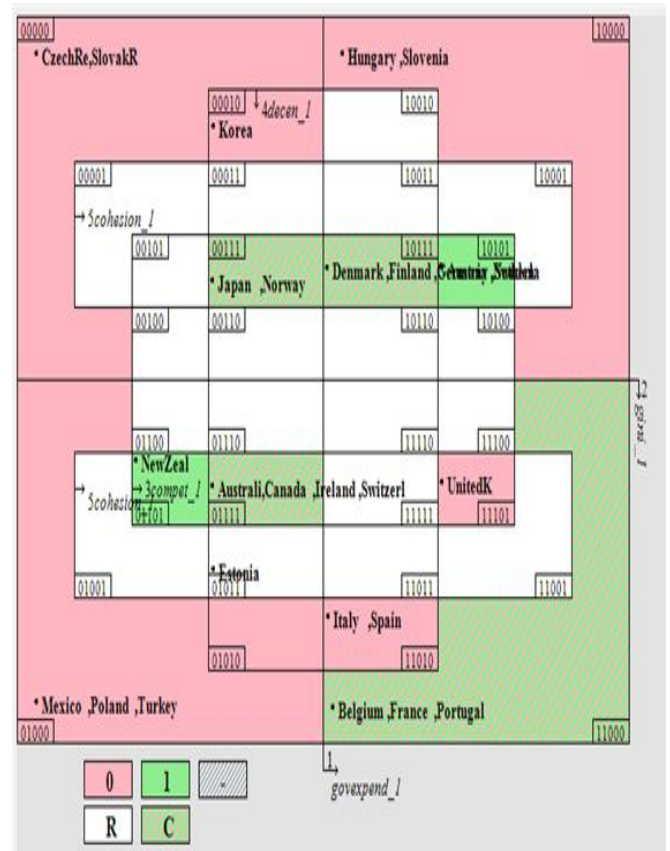


Figure 3: Analysis results presented as a Venn diagram

Table 1: Performance of Australian regions by well-being dimensions

	Australian regions		Country Average	OECD average
	Top 20%	Bottom 20%	Country Average	OECD Average
Safety				
Homicide rate (per 100,000 people), 2012	0.8	3.3	1.1	4.2
Health				
Life expectancy at birth (years), 2012	82.4	79.0	82.0	79.5
Age adjusted mortality rate (per 1,000 people), 2012	6.4	8.4	6.8	8.1
Education				
Labor force with at least a secondary degree (%), 2013	78.3	66.7	75.3	74.6
Access to services				
Households with broadband access (%), 2013	78.4	70.8	75.0	67.2
Jobs				
Employment rate (%), 2013	74.5	73.1	74.5	66.7
Unemployment rate (%), 2013	4.2	5.9	5.3	8.0
Housing				
Rooms per person, 2012	2.4	2.2	2.3	1.8
Income				
Household disposable income per capita (in USD), 2011	37,034	21,873	23,556	18,907
Civic engagement				
Voters in last national election (%), 2013	78.4	70.8	75.0	67.7
Environment				
Level of air pollution (PM _{2.5}) experienced by regional population (µg/m ³), 2012	2.7	4.6	3.4	12.3

Source: OECD (2014: 136).

Table 2: Operationalization of individual variables

Variables (abbrev.)	Operationalization	Standards of division	Remarks
government expenditure (<i>govexpend</i>)	Percentage of government expenditure out of GDP (%)	If larger than the OECD median (44.35%), 1; if not, 0	<i>World Competitiveness Yearbook</i> (IMD, 2014)
income inequality (<i>gini</i>)	Degree of income inequality	If larger than the Gini coefficient median (3.3), 1; if not, 0	<i>World Competitiveness Yearbook</i> (IMD, 2014)
national competitiveness (<i>comp</i>)	Score for a nation's national competitiveness	If larger than the national competitiveness median (71,66), 1; if not, 0	<i>World Competitiveness Yearbook</i> (IMD, 2014)
local decentralization (<i>decen</i>)	Degree of decentralization	By using the OECD tax and expenditure decentralization total score, if larger than the median (12.8) 1, if not 0	OECD Statistics 2014 standards
social cohesion (<i>cohesion</i>)	Degree of social cohesion of society members	If larger than the social cohesion score median (6.12) 1, if not 0	<i>World Competitiveness Yearbook</i> (IMD, 2014)
level of regional well-being (<i>well-being</i>)	Degree of having a high regional well-being score as well as having small regional differences	After standardizing regional well-being scores, nations whose standardized score is larger than the median (0.2024) and regional balance score is larger than the median (0.12) is 1, all other nations are 0	o The regional well-being score is the average obtained by adding the 9 dimensions and 11 indices o The regional balance score is calculated by subtracting the bottom 20% average score from the top 20% average score, and calculating the standardized value of differences for individual nations and the median value

Table 3: z score and regional well-being scores of nine dimensions

	Zsafety	Zhealth	Zeduc	Zaccess	Zjobs	Zhouse	Zincome	Zcivic	Zenvir	Zwellbeing
Australia	0.32	0.95	-0.16817	0.33529	0.81	1.26085	1.23287	0.48301	1.59	0.7568
Austria	0.39	0.41	0.40187	0.42269	0.82	4.67E-16	0.81378	0.47495	-0.73	0.3339
Belgium	0.16	0.18	0.08971	0.40252	-0.2	1.05071	0.34991	1.62793	-0.87	0.3115
Canada	0.19	0.74	0.74797	0.77227	0.53	1.68113	0.82747	-0.61353	0.95	0.6476
Chile	-0.24	0.24	-0.01887	-2.35377	0.03	-1.05071	-1.68291	1.45055	1.07	-0.2848
Czech Re	0.19	-0.99	1.13478	-0.33697	0.22	-0.63043	-0.71088	-0.76672	-0.8	-0.2998
Denmark	0.39	-0.19	-0.07995	1.02773	0.58	1.05071	-0.29017	1.50699	0.23	0.4693
Estonia	-0.55	-1.53	0.84976	0.20084	-0.01	-1.05071	-1.27235	-0.44421	0.83	-0.3309
Finland	0.39	0.2	0.51724	0.98739	0.27	0.42028	-0.09109	-0.00882	1.14	0.4257
France	0.29	0.91	-0.02566	0.33529	-0.39	0.21014	0.49148	0.91034	0.04	0.3078
Germany	0.39	0.3	0.57153	0.78571	0.75	1.05071	0.70184	0.20081	-0.45	0.4779
Greece	0.22	0.04	-0.52105	-1.32521	-2.38	-1.05071	-0.15826	0.14437	-0.57	-0.6226
Hungary	0.22	-2.22	0.63939	-0.22269	-0.82	-1.26085	-1.22387	-0.37165	-1.06	-0.7031
Ireland	0.16	0.27	0.19828	-0.28992	-0.92	0.84057	0.27839	0.07181	1.21	0.2024
Israel	0.11	0.77	0.73439	0.02605	0.31	-1.26085	-1.14269	-0.09751	-1.78	-0.2588
Italy	0.37	1.06	-0.89429	-0.78739	-0.7	-0.63043	0.07223	0.49914	-0.73	-0.1941
Japan	0.39	1.31	0.23222	0.16723	1.16	0.42028	0.18304	-0.78285	-0.29	0.3097
Korea	0.04	0.64	0.19828	1.6126	0.59	-0.84057	-0.3794	0.54752	-1.97	0.0483
Mexico	-5.25	-1.77	-2.5637	-3.02604	0.18	-1.47099	-1.50558	-1.96808	0.18	-1.9098
Netherlands	0.37	0.41	-0.17496	0.98739	0.84	0.63043	0.04001	0.51526	-0.57	0.339
New Zealand	0.34	0.45	-0.30389	0.33529	0.72	0.84057	-0.27986	0.41851	1.79	0.479
Norway	0.44	0.52	0.23222	0.98739	1.24	0.63043	0.72793	0.74102	1.35	0.7643
Poland	0.14	-1.35	0.99227	-0.28992	-0.75	-1.47099	-1.06748	-1.62138	-0.91	-0.7027
Portugal	0.32	0.12	-2.48905	-0.69328	-0.62	0.42028	-0.43014	-0.88767	0.77	-0.3885
Slovak R	0.16	-1.88	1.11442	-0.28992	-0.96	-1.05071	-0.91591	-0.79897	-0.87	-0.6104
Slovenia	0.06	-0.01	0.69368	-0.00084	-0.14	-0.63043	-0.35428	-2.14547	-0.7	-0.3585
Spain	0.37	0.96	-1.31504	-0.26975	-2.31	0.42028	0.02504	-0.00882	0.44	-0.1874
Sweden	0.37	0.65	0.36115	1.1084	0.64	4.67E-16	0.17515	1.25704	0.93	0.6104
Switzerland	0.44	1.09	0.40866	0.73865	1.37	4.67E-16	1.69143	-1.66976	-0.68	0.3769
Turkey	-0.01	-1.68	-2.67907	-1.61428	-1.07	-1.47099	-0.7062	1.49893	-1.01	-0.9718
UK	-0.6	-0.29	0.55795	0.13361	0.11	1.47099	2.30026	-0.08138	0.74	0.4814

Table 4: Policy variables that affect regional well-being and regional balance of OECD nations

Country	Govexpend	Gini	Compet	Decen	Cohesion	Zwellbeing	Zdisparity
Australia	36.8	3.5	79.55	17.8	7.9	0.7568	-0.02
Austria	51.2	2.9	73.69	4.8	7.09	0.3339	0.24
Belgium	54.4	3.3	66.59	9.8	5.93	0.3115	0.36
Canada	40.3	3.3	85.42	47	7.7	0.6476	-0.51
CzechRe	42.3	2.6	62.21	1.1	5.35	-0.2998	0.18
Denmark	57.1	2.5	84.04	33.2	7.77	0.4693	0.71
Estonia	42	3.6	64.38	13	4.56	-0.3309	-0.21
Finland	58.3	2.7	78.15	20.7	6.94	0.4257	-0.3
France	57.1	3.3	67.94	11.5	4.52	0.3078	0.04
Germany	44.7	2.8	85.78	29.2	6.91	0.4779	0.21
Hungary	50	3.1	52.5	6.3	3.25	-0.7031	0.28
Ireland	42.9	3.4	80.36	22.9	7.83	0.2024	0.92
Italy	51.2	3.6	52.87	16.6	4	-0.1941	-0.84
Japan	40	2.5	73.76	25.2	7.63	0.3097	0.05
Korea	21	3.2	69.64	17.4	5.77	0.0483	0.12
Mexico	26	4.8	57.28	3.2	4.1	-1.9098	-1.32
Netherla	49.8	3.1	81.14	3.9	6.78	0.339	0.91
NewZeal	35.6	3.6	74.93	5.3	7.32	0.479	0.99
Norway	44	2.6	83.29	13.4	8.19	0.7643	0.54
Poland	41.9	3.4	61.76	12.6	4.08	-0.7027	0.09

Portugal	48.7	3.9	54.4	5.1	4.75	-0.3885	-0.64
SlovakR	38.7	2.6	53.3	2.7	4.96	-0.6104	0.23
Slovenia	59.4	3.1	46.24	7.4	4.88	-0.3585	0.92
Spain	44.8	3.5	57.91	30.8	5.42	-0.1874	-0.48
Sweden	52.9	2.5	85.83	32.2	6.9	0.6104	0.55
Switzerl	33.3	3.4	92.42	40.8	7.9	0.3769	0.29
Turkey	26.1	3.9	57.86	7.6	4.76	-0.9718	-0.99
UK	47.1	3.6	79.81	4.8	6.31	0.4814	-0.93

Table 5: Dichotomization results of independent variables and dependent variables

Country	govexpend_1	gini_1	compet_1	decen_1	cohesion_1	WELLDISPA
Australia	0	1	1	1	1	0
Austria	1	0	1	0	1	1
Belgium	1	1	0	0	0	1
Canada	0	1	1	1	1	0
CzechRe	0	0	0	0	0	0
Denmark	1	0	1	1	1	1
Estonia	0	1	0	1	0	0
Finland	1	0	1	1	1	0
France	1	1	0	0	0	0
Germany	1	0	1	1	1	1
Hungary	1	0	0	0	0	0
Ireland	0	1	1	1	1	0
Italy	1	1	0	1	0	0
Japan	0	0	1	1	1	0
Korea	0	0	0	1	0	0
Mexico	0	1	0	0	0	0
Netherla	1	0	1	0	1	1
NewZeal	0	1	1	0	1	1
Norway	0	0	1	1	1	1
Poland	0	1	0	0	0	0
Portugal	1	1	0	0	0	0
SlovakR	0	0	0	0	0	0
Slovenia	1	0	0	0	0	0
Spain	1	1	0	1	0	0
Sweden	1	0	1	1	1	1
Switzerl	0	1	1	1	1	1
Turkey	0	1	0	0	0	0
UK	1	1	1	0	1	0

Table 6: Truth table analysis results

Truth Table:

v1:	govexpend_1	v2:	gini_1			
v3:	compet_1	v4:	decen_1			
v5:	cohesion_1					
O:	WELLDISPA	id:	country			
v1	v2	v3	v4	v5	O	id
0	1	1	1	1	C	Australi,Canada ,Ireland ,Switzerl
1	0	1	0	1	1	Austria ,Netherla
1	1	0	0	0	C	Belgium ,France ,Portugal
0	0	0	0	0	0	CzechRe,SlovakR
1	0	1	1	1	C	Denmark ,Finland ,Germany ,Sweden
0	1	0	1	0	0	Estonia
1	0	0	0	0	0	Hungary ,Slovenia
1	1	0	1	0	0	Italy ,Spain
0	0	1	1	1	C	Japan ,Norway
0	0	0	1	0	0	Korea
0	1	0	0	0	0	Mexico ,Poland ,Turkey
0	1	1	0	1	1	NewZeal
1	1	1	0	1	0	UnitedK

Result:

GOVEXPEND_1 + gini_1 + COMPET_1 + decen_1 + COHESION_1 + (Austria ,Netherla) (NewZeal) govexpend_1 + GINI_1 + COMPET_1 + decen_1 + COHESION_1

Conclusion

This paper emphasizes the importance of regional well-being, describes the usefulness of QCA in examining what causal conditions can influence high levels of regional well-being in OECD countries, and attempts to discover configurations associated with regional well-being. In this analysis, two configurations affecting regional well-being, which are sets of conditions suggesting a relationship or solution between the conditions, are derived. QCA is an alternative approach to analysis in regional well-being that involves truth tables, Boolean algebra, and a search for a greater understanding of causal conditions. The use of QCA has rarely been reported in regional well-being studies, and there are likely to be conceptual and paradigmatic challenges to its adoption in some settings. Future research will be required to measure not only objective regional well-being but also subjective regional well-being. This research covered only the objective aspect of regional well-being and did not cover subjective regional well-being. Research that measures regional well-being using a comprehensive approach that covers both objective and subjective aspects and discovers the combined conditions that affect these regional well-being levels may produce more significant policy implications.

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References

- [1] ABS. (2012) *Measures of Australia's Progress: Aspirations for Our Nations*. Canberra: Australian Bureau of Statistics.
- [2] Andrews, F. M., and Withey, S. B. (1976) *Social indicators of well-being*. New York and London: Plenum.
- [3] Argyle, M., Martin, M. and Crossland J.(1989) Happiness as a function of personality and social encounters. In J. P. Forgas, and J. M. Innes (eds), *Recent advances in social psychology: An International perspective* (pp.189–203). North-Holland: Elsevier.
- [4] Ben-Arieh, A. (2006) Measuring and Monitoring the Well-being of Young Children around the World. *Paper commissioned for EFA Global Monitoring Report 2007*. Storing Foundations: Early Childhood Care and Education.
- [5] Birch, E. et al. (2011) *Measuring US Sustainable Development*. Penn IUR White Paper Series of Sustainable Urban Development. Philadelphia, PA: Penn Institute for Urban Research, Department of City and Regional Planning, University of Pennsylvania.
- [6] Bjørnskov, C., Drehe, A. and Fischer, J. (2008). On decentralization and life satisfaction, *Economic Letters* 99, 147–51.
- [7] Campbell, A. Converse, P. E. and Rodgers, W. L. (1976) *The quality of American life*. New York: Sage.

- [8] Choi, M. O. and Moon, Y. S. (2011) Analysis of happiness determinants in Busan residents, *Local Government Studies Review* 15(1), 277–97.
- [9] Choi, Y. C. (2008). Relationships between national competitiveness and decentralization, Korean Association of Local Government Studies Summer Conference Proceedings.
- [10] Diener, E. (1984) Subjective well-being. *Psychological Bulletin*, 193, 542–75.
- [11] Diener, ED, and Michael Chan. (2012). Happy People Live Longer: Subjective Well-being Contributes to Health and Longevity. *Applied Psychology: Health and Well-being*, 3(1), 1-43.
- [12] Diener, ED, and Martin E. P. Seligman. (2002). Very Happy People. *Psychological Science*, 13 (January), 81-84.
- [13] Dunn, Elizabeth W., Lara B. Aknin, and Michael I. Norton. (2008). Spending Money on Others Promotes Happiness. *Science*, 319 (March), 1687-88.
- [14] Donnelly, F. and Wiechula, R. (2013) An example of qualitative comparative analysis in nursing research, *Nurse Researcher*, 20, 6, 6–11.
- [15] Easterlin, Richard A. (2003). Building a Better Theory of Well-being. Proceedings of the National Academy of Science, 100 (September), 11176-83.
- [16] Fordyce, M. W. (1988) A review of research on the happiness measure: a sixty second index of happiness and mental health. *Social Indicators Research*, 20, 355–81.
- [17] Fukasaku, K. and de Mello, L. (1998) Fiscal Decentralization and Macroeconomic Stability: The Experience of Large Developing Countries and Transition Economies in Democracy. In K. Fukasaku and R. Hausmann (ed.), *Decentralization and Deficits in Latin America*. Paris: Development Centre of the OECD.
- [18] Gao, S., Mokhtarian, P. and Johnston, R. (2008) Exploring the connections among job accessibility, employment, income, and auto ownership using structural equation modeling, *Ann Reg Sci*, 42, 341–56.
- [19] Greve, B. (2010) *Happiness and Social Policy in Europe*. Northampton: Edward Elgar.
- [20] Ha, H. S. (1996) Analysis of determinants affecting quality of life in urban government, *Korean Public Administration Review* 30(2), 81–95.
- [21] Han, P. H. (1995) *Development of Urban Indicators and their Application*. KRILA Report. Seoul: KRILA.
- [22] IMD (2014) *World Competitiveness Yearbook*. Geneva: IMD.
- [23] Kahneman, Daniel, Alan B. Krueger, David Schkade, Norbert Schwarz, and Arthur Stone. (2004). A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method, *Science*, 306 (December), 1776-80.
- [24] Kee, Y., Seo, I., and Nam, C. (2014). Two Faceted Perceptions of Community Well-being in Juxtaposition With Objective Conditions. *Local Administration Review*, 28(4), 39-71.
- [25] Keyes, C. L. M. (2005) The subjective well-being of America's youth: Toward a comprehensive assessment. *Adolescent and Family Health*, 4, 1–32.
- [26] Kim Shin-Young and Baek Hye-Jeong. (2008) Developing Happiness Index for Korean Adolescents. *Korean Sociology*, 42(6), 140–73.
- [27] Kim, S. K., Jang, Y. S., Cho, H. S. and Cha, M. S. (2008) *Happiness Index and Happiness Determinants*. Korea Health and Society Research Institute Report. Seoul: KHSR.
- [28] Lee, T. J., Park, C. M. and Song, K. S. (2005) Analysis of quality of life of local residents, *Korean Local Government Review*, 12(4), 75–92.
- [29] Lim, H. S. (1996) Conceptual discussions on quality of life, *Korean Public Administration Review*, 5(1), 5–18.
- [30] Lyubomirsky, S., Ken M. Sheldon, and David A. Schkade. (2005) Pursuing Happiness: The Architecture of Sustainable Change, *Review of General Psychology*, 9 (2), 111-31.
- [31] Mogilner, Cassie. (2010). The Pursuit of Happiness: Time, Money, and Social Connection, *Psychological Science*, 21 (1), 1348-54.
- [32] Mogilner, Cassie, Sepandar D. Kamvar, and Jennifer Aaker. (2011). The Shifting Meaning of Happiness, *Social Psychological and Personality Science*, 2 (4), 395-402.
- [33] OECD. (2013) *OECD Guidelines on Measuring Subjective Well-being*. Paris: OECD.
- [34] OECD. (2014) *How's Life in Your Region?* Paris: OECD.
- [35] OECD. (2014). OECD Database. Paris: OECD.
- [36] Poveda, A.C. (2013) Qualitative comparative analysis: an application for industry. *Qual Quant*, 47, 1,315–21.
- [37] Ragin, CC. (1987). *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*. Berkeley CA: University of California Press.
- [38] Rihoux, B. (2006) Qualitative comparative analysis (QCA) and related systematic methods: recent advances and remaining challenges for social sciences research. *International Sociology*. 21, 5, 679–706.
- [39] Seligman, E. P. (2004) *Can happiness be taught?*, Daedalus, spring.
- [40] Soh, J. K. (1998) Definition of quality of life and its policy implications for urban policy, *Regional Community Development Review*, 23(1), 65–84.
- [41] Tanzi, V. and Schuknecht, L. (1998) Can Small Governments Secure Economic and Social Wellbeing? In Grubel, H. (ed.), *How To Spend the Fiscal Dividend: What is the optimal size of government?* Vancouver: Fraser Institute.
- [42] UN (2013) *World Happiness Report 2013*. N.Y.: United Nations.
- [43] Van Boven, Leaf, and Thomas Gilovich. (2003). To Do or To Have: That is the Question. *Journal of*

- Personality and Social Psychology*, 85(December), 1193-202.
- [44] Vink, M. P. and Van Vliet, O. (2009) Not quite crisp, not yet fuzzy? Assessing the potential and pitfalls of multi-value QCA, *Field Methods*, 21, 3, 265–89.
- [45] Wager, C. and Schneider, C. (2010) Qualitative comparative analysis(QCA) and fuzzy sets: agenda for a research approach and a data analysis technique. *Comparative Sociology*, 9, 376–96.
- [46] Wiechula, D. (2012) An example of qualitative comparative analysis in nursing research, *Nurse Researcher*, 206, 6–11.
- [47] World Economic Forum (2013) *Global Competitiveness Report*.
- [48] Xie, D., Zou, H. and Davoodi, H. (1999) Fiscal decentralization and economic growth in the United States, *Journal of Urban Economics*, 45, 228–39.
- [49] Yang, Y. (2008) Social Inequalities in happiness in the U.S. 1972–2004: An Age-Period-Cohort Analysis. *American Sociological Review*, 73(2), 204–26.
- [50] Zhang, T. and H. Zou (1998). Fiscal decentralization, public spending and economic growth in China, *Journal of Public Economics*, 67(2), 221–40. <http://www.businessdictionary.com/>