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Socioeconomic Well-Being and the Quality of Life Between Regions: A Case of Malaysia

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Abstract: The increase in Gross Domestic Product (GDP) is associated with the growth of the country's economy and that basic needs such as health and education would develop as a by-product of growth in GDP. However, development experts acknowledge that high levels of per capita GDP and industrialization are neither necessary nor sufficient for meeting basic needs. Attempts have been made to device indices that reflect the extent to which basic needs are satisfied. One of the best known of these indicators is the Physical Quality of Life Index (PQLI). This study attempts to measure the PQLI between the states in Malaysia. Results show that the more developed states with high GDP also experienced high PQLI but nevertheless although, some states experienced high GDP, the PQLI are low and vice versa.

Key words: Socioeconomic well-being, GDP, PQLI, PCA, School, Malaysia

INTRODUCTION

Malaysia aims to become a fully developed country by the year 2020. Located in a dynamic economic region of Asia Pacific and in the heart of ASEAN, Malaysia shares the economic vitality of the region and has emerged as one of the most dynamic Asian economy. Malaysia's economy is indeed growing fantastically as seen in the increasing of Gross Domestic Product (GDP) and GDP per capita. With the increase in income per capita, the regional income too increases. Hence, the economic growth has brought about the increase in regional income and the betterment of the community. Is this really so? This study attempts to measure the Quality of Life (QoL) between the 14 regions (states) in Malaysia.

Economists had assumed that basic needs such as health and education would develop as a natural by-product of the growth in GDP (Rahman *et al*., 2003). However, this was not the case necessarily. Seers (1972) questioned what was happening to poverty, unemployment and imbalances while Todaro (1994) included many aspects of life in development. Burkett (1985) noted that development specialists now acknowledge that high levels of per capita GDP and industrialization are neither necessary nor sufficient for meeting basic needs. He further noted that development experts have attempted to device indices which reflect the extent to which basic needs are satisfied. Among the best known of these indicators is the physical quality of life index PQLI, a weighted average of indices of literacy, infant mortality and life expectancy at age 1 (Morris, 1979; Rahman *et al*., 2003). These indicators were used to form a simple composite index.

According to Morris (1979) those three variables are usually specified because they are regarded as unethnocentric measure results rather than inputs, reflect distribution as well as aggregate wealth and are internationally comparable. These indices are usually constructed as the literacy index (the percentage of a population 15 years and older that is literate), the infant-mortality index and on the life expectancy index (zero represents the shortest life expectancy recorded for any country in the postwar period and 100 represents the longest forecast life expectancy).

The three indices are usually averaged to obtain the PQLI. The PQLI is constructed by arbitrarily giving equal weight to three indices. Once a country's performance in life expectancy, infant mortality and literacy has been rated on the scale of 1-100, the composite index for the country is calculated by averaging the three ratings giving equal weight to each. As Burkett (1985) notes, it happens to be very highly correlated with the first principal component of these indices (Larson and Wilford, 1979; Rahman *et al*., 2003; Ram, 1982).

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Sen (1985, 1987) called into question, the view that basic needs can be represented by a three vector PQLI. He points out that capabilities are as important as commodities in analyzing the standard of living. This suggests the need for a much broader analysis which will be multidimensional in nature. That is not only will consumption (GNP) and life expectancy matter but the environment in which one lives (both economic and political) matters too (Slottje, 1991).

Although, the study found that countries with low per capita GNP tended to have low PQLIs and countries with high per capita GNP tended to have high PQLIs, the correlations between GNP and PQLI were not substantially close. Some countries with high per capita GNP had very low PQLIs even below the average of the poorest countries. Other countries with very low per capita GNP had PQLIs that were higher than the average for the upper middle income countries.

MATERIALS AND METHODS

In order to construct some aggregate indexes of the quality of life and to demonstrate how relative rankings of well-being between regions will vary, a total of 21 attributes or variables over 14 states were selected. The variables from N_1-N_{21} across the 14 regions are shown in Table 1. All the data were gathered from the various publications of the Statistic Department of Malaysia and also the various publications of the development plans of Malaysia.

The technique used in this study is the Principal Component Analysis (PCA) which analyses how much independence there is in the variables used. This method allows the transformation of the original data set into a new data set where the variables are pair-wise uncorrelated and where the first variables (the first principal component) will have the maximum variance with those uncorrelated with the first principal component etc. Since, there are 14 states and 21 variables the data matrix is a 14×21 matrix X:

$$X = [x_{ij}]\ I = 1,..., 14 \quad j = 1,...., 21$$

This X matrix is transformed into a new matrix Z where Z is the principal component matrix of X. The new variables contain as much information as the original but without any multicollinearity problems. The aim of the procedure is to reduce the number of variables that may contribute to the description of the socioeconomic well-being and the quality of life of a region to one or more interpretable representative index (es) (or components), as in Slottje (1991). The statistical package used was SAS. The PCA provide a means for estimating eigenvalues and component loadings (eigenvectors) for the various variables used and component scores for the various regions studied. The component scores were finally used as the new indicators of the socioeconomic well-being or quality of life of the regions.

Table 1: Quality of life variables

Regions	Quality of life variables
Johor	.
Kedah	.
Kelantan	.
Melaka	.
Negeri Sembilan	.
Pahang	N_1 N_2 N_3 N_4 N_5 N_6 N_7 ... N_{21}
Perak	.
Perlis	.
Pulau Pinang	.
Sabah	.
Sarawak	.
Selangor	.
Terengganu	.
Wilayah Persekutuan	.

N_1 = Population density per square kilometer; N_2 = Percentage of population enrolled in schools; N_3 = Number of doctors for every 10,000 population; N_4 = Number of pupils for every teacher (primary school); N_5 = Number of pupils for every teacher (secondary school); N_6 = Number of hospital beds for every 10,000 population; N_7 = Neonatal mortality rate; N_8 = Infant mortality rate; N_9 = Children mortality rate; N_{10} = Number of telephone subscribers; N_{11} = Dependency ratio; N_{12} = Number of dentists for every 10,000 population; N_{13} = Number of nurses for every 10,000 population; N_{14} = Rate of stillborn; N_{15} = Juvenile cases for every 10,000 population; N_{16} = Number of fire stations for every 10,000 population; N_{17} = Fire cases for every 10,000 population; N_{18} = Car ownership for every 10,000 population N_{19} = Post offices for every 10,000 population; N_{20} = Public telephones for every 10,000 population; N_{21} = Gross domestic product per capita

The PCA was carried out on four data sets representing the 21 variables for various years considered in the study.

RESULTS AND DISCUSSION

The first output of the PCA is the correlation matrix. From the correlation matrix the interrelationship having high correlation coefficient can be conveniently explained from the population (demographic) point of view. The correlation coefficients between population density N_1 and all the other variables for the various years are shown in Table 2. Population density is a direct effect of the increase in population of a region. From the correlation matrix, population density has a direct relationship with the number of doctors N_3, dentists N_{12} and nurses N_{13} for every 10,000 population with corresponding coefficients >0.9. It is interesting to see that population density is negatively or inversely related (although, weak correlation) to initial life mortality-neonatal mortality rate N_7, infant mortality rate N_8, children mortality rate N_9, mortality rate at birth N_{14} indicating a tendency that although, population had increase in the various regions, the regions are able to provide medical facilities.

Table 2: Correlation coefficients between population density and other variables in various years

Variables	2000	2002	2004	2006
Population density	1.000	1.0000	1.000	1.000
Percentage of population enrolled in schools	-0.089	-0.2390	-0.342	0.458
Doctors per 10,000 population	0.968	0.9810	0.983	0.984
Number of pupils per teacher (primary school)	0.595	0.0580	0.571	0.583
Number of pupils per teacher (secondary school)	0.475	0.4460	0.440	0.315
Number of hospital beds per 10,000 population	0.620	0.6460	0.611	0.559
Neonatal mobility rate	-0.325	-0.3330	-0.170	0.016
Infant mortality rate	-0.460	-0.5000	-0.312	0.068
Children's mortality rate	-0.378	-0.4270	-0.448	-0.219
Telephone subscribers per 10,000 population	0.846	0.7050	0.654	0.631
Total dependency ratio	-0.504	-0.4360	-0.395	-0.632
Number of dentists per 10,000 population	0.944	0.9460	0.945	0.951
Number of nurses per 10,000 population	0.970	0.7780	0.740	0.898
Mortality rate at birth	-0.330	-0.1700	-0.120	-0.047
Juvenile cases per 10,000 population	0.893	0.7610	0.925	0.757
Fire stations per 10,000 population	-0.322	-0.3870	-0.058	-0.165
Fires per 10,000 population	0.407	0.0860	0.394	0.359
Car ownerships per 10,000 population	0.569	0.6830	0.757	0.936
Post offices per 10,000	0.086	-0.0138	-0.035	0.042
Number of public phones per 10,000	0.444	0.3710	0.134	0.346
GDP per capita	0.596	0.5730	0.574	0.728

Relationship with percentage of pupil in primary and secondary school is weak although, significant at p = 0.5 with correlation coefficient approximately equal to 0.5. Fairly significant relationships between population density and number of telephone subscribers and car owners with correlation coefficients of 0.8 and 0.7, respectively are a direct effect of population increase.

Another interesting point is the positive relationship between population density and juvenile cases N_{15} with correlation coefficient of 0.8927. An increase in population density in urban areas would contribute to problems in juvenile delinquencies for example many school children can be seen skipping classes and having good times at shopping centers.

The second stage of the PCA is the estimation of eigenvectors of the principal component with respect to the variables used. From the correlation and component loading matrixes only component 1 contains interpretable relationships. Comparing from the correlation coefficients and the component loadings the interpretation of the component can be made loading values >+0.2 and <-0.2. The interpretation of the component would focus on N_1, N_3, N_4, N_6, N_8, N_9, N_{10}, N_{11}, N_{12}, N_{13}, N_{15}, N_{18}, N_{20} and N_{21} where the classification of the variables are made accordingly as shown in Table 3.

All these groupings are well correlated with population density i.e., population growth and therefore we can name this component as population related component as discussed earlier. The loading of component 1 are rather consistent with time from 2000-2006 (Table 4). This population related component can be used in the interpretation of the well being of the people or the PQLI the physical quality of life index which has been defined before.

Table 3: Classification of variables for the determination of component 1

Classes	Variables
Population related	N_1, N_{11}
Medical related	N_3, N_2, N_{13}, N_8, N_9
Social problem related	$N1_5$
Social affluence/amenities related	N_{10}, N_{18}, N_{20}, N_{21}

The other components indicate no clear interpretable groupings which seem to be contributing to the unique variances in an orthogonal manner confirmed by the eigenvalues.

The first component account for 49% (the maximum) of the variance for 2000, 44% for 2002, 41% for 2004 and 47% for 2006 data set. In component 1, some variables have positive and some have negative loadings. Values >+0.2 on the component is associated with all groupings except for variable N_{11} the total dependency ratio and the medical related variables with respect to mortality rates (N_8 and N_9).

Interpretation of component 1 focuses on its bipolar nature. This may indicate that with the increase in population the country is able to provide better medical facilities (i.e., increase in the number of doctors, dentists and nurses) and therefore a decrease in mortality rates N_{14} (mortality rate at birth) and N_7 (neonatal mortality rate) has negative loadings although, the values are >-0.2.

By using the PCA, we can estimate the component scores for each observation which form the final stage of PCA. The component scores for component 1 for the various years and regions are shown in Table 5. The relative position of each region on the component chosen can be judged.

As discussed before, the component was interpreted as having implication on the socioeconomic well-being

Table 4: Component loadings (eigenvectors) of principal component 1 of the variables with time

	Principal 1			
Parameters	2000	2002	2004	2006
Population density	0.2731	0.2883	0.3043	0.2665
Percentage of population enrolled in schools	0.0017	0.0261	0.0033	0.2527
Doctors per 10,000 population	0.2903	0.3074	0.3220	0.2844
Number of pupils per teacher (primary school)	0.2102	0.2424	0.2082	0.2199
Number of pupils per teacher (secondary school)	0.1591	0.1828	0.1994	0.0846
Number of hospital beds per 10,000 population	0.2186	0.2231	0.2377	0.2240
Neonatal mobility rate	-0.1819	-0.1305	-0.0937	-0.0620
In fact mortality rate	-0.2403	-0.2247	-0.1694	-0.1183
Children's mortality rate	-0.2104	-0.2220	-0.2118	-0.1882
Telephone subscribers per 10,000 population	0.2984	0.3105	0.3097	0.2958
Total dependency ratio	-0.2215	-0.2094	-0.2127	-0.2740
Number of dentists per 10,000 population	0.2850	0.3042	0.3189	0.2886
Number of nurses per 10,000 population	0.2714	0.2125	0.2190	0.2406
Mortality rate at birth	-1145.0000	-0.0818	-0.0998	-0.0068
Juvenile cases per 10,000 population	0.2624	0.2723	0.3002	0.2558
Fire stations per 10,000 population	-0.0845	-0.0935	0.0234	-10196.0000
Fires per 10,000 population	0.1882	0.7183	0.1769	0.2411
Car ownerships per 10,000 population	0.2545	0.2987	0.3130	0.2931
Post offices per 10,000	0.0996	0.0152	0.0240	0.0737
Number of public phones per 10,000	0.2205	0.2089	0.1297	0.2157
GDP per capita	0.2179	0.2199	0.2176	0.2442

Table 5: Component scores or PQLI of the different states of Malaysia with time

	Principal 1			
Regions	2000	2002	2004	2006
Johor	-0.0647	-0.1200	-0.0391	0.0744
Kedah	-0.6959	-0.7378	-0.5989	-0.5498
Kelantan	-1.2834	-1.0415	-1.2191	-1.1796
Melaka	0.0687	0.2202	-0.0201	0.3615
Negeri Sembilan	0.4100	0.2535	0.2079	0.1780
Pahang	-0.7548	-0.9119	-0.6268	-0.5044
Perak	-0.2731	-0.1823	-0.0893	0.1233
Perlis	-0.5102	-0.4200	-0.2231	-0.1076
Penang	0.6348	0.9134	0.7746	0.9335
Sabah	-0.8332	-0.6277	-0.6991	-1.3780
Sarawak	-0.1135	-0.4046	-0.3741	-0.5140
Selangor	0.6622	0.8751	0.7526	0.6734
Terengganu	-0.6083	-0.7326	-0.8651	-0.7772
Wilayah Persekutuan	2.8511	2.9168	3.0193	2.7666

and the quality of life of the different regions of Malaysia and the scores can be used as the PQL index as done by Slottje (1991).

Generally the PQLIs do not change much with the years 2000-2006. Only 5 states have positive index throughout the years with the state of Melaka having negative index in 2004. The PQLI for the state of Johor has become positive in 2006. For the state of Negeri Sembilan the PQLI has decreased with the years from 0.41-0.178.

The state of Kelantan on the other hand generally showed the lowest PQLIs while Sabah had the lowest PQLI in 2006 with a value of -1.378. Wilayah Persekutuan had the highest PQLI which peaked in 2004 with a value of 3.0193. Comparison can be made between PQLI and the GDP of the various regions. GDP values are naturally used to indicate economic growth of a region. By comparing these two entities one can judge whether economic growth has really played its role in upgrading the socioeconomic well-being and the quality of life of the population. One interesting point that can be deduced from the comparison is that increase in GDP (2006) would not necessarily increase the socioeconomic well-being and quality of life of the population. Even with higher GDP, Wilayah Persekutuan showed a decrease in PQLI in 2006.

The worst scenario was for the state of Terengganu that experienced an increase in GDP with the years, comparable to the state of Selangor but had negative PQLIs. The state of Penang also experienced a big increase in GDP in 2006 but did not make a significant improvement in the socioeconomic well-being of the people at that time. The use of GDP to indicate differences in PQLI across regions is rather limited. It certainly does not reflect an increase in the quality of life with time. This approach of analysis is useful for regional planners to look into economic disparities between regions.

Although, Malaysia is experiencing rapid growth and development, not all people in the country are enjoying the fruits of development. The study shows that regional disparities do exist between regions and especially between Wilayah Persekutuan and that of Terengganu, Kelantan and Sabah. Although, Terengganu and Sabah are experiencing a high GDP, the socio-economic and the quality of life of the people measured by the PQLI indexes do not indicate that they are enjoying the benefits of growth. During the Ninth Malaysia Plan, measures will be undertaken to accelerate the development of the less fortunate states with the launching of the development corridors (Malaysia, 2006). These development corridors

will be continued in the 10th Malaysia Plan 2010-2015 (Malaysia, 2010). These bold plans would help to accelerate the development of all those regions undertaken by government link agencies namely Khazanah Nasional, Sime Darby and Petronas.

CONCLUSION

This study reveals that although, the country is experiencing rapid growth and development and that regional development policies are being implemented, regional inequalities indicated by the socioeconomic well-being or PQLI clearly exist. Ali (2009) also found that the gap of the average income between the rich states and the poor states tend to increase. In certain regions although, GDP had increased significantly, PQLI are still comparatively low especially as in the states of Terengganu and Sabah. The overall objective of regional development is to ensure a more balanced development in terms of a better distribution of the benefits of development across and within regions.

Therefore, the thrust of regional development is aimed at achieving balanced regional development. The regional development strategies in due course would hopefully able to reduce the disparities in social and economic development across regions and raised the socioeconomic well-being and quality of life of the population particularly in the less developed regions.

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