JOINT ANALYSIS OF DIFFERENCES IN CENTRAL TENDENCY AND VARIABILITY

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ABSTRACT

This study attempts to show the value of joint analysis of central tendency and variability. If differences in distributions are systematically classified according to their central tendencies and variabilities, much light can be shed on the comparisons. The principal benefit of such approach lies in the research questions raised and in the emphasis given to sound explanation and interpretation of data.

Consider a hypothetical situation involving two matched groups of individuals. One group is taught by Method A and the other by Method B. on an academic achievement test, Method B yields the larger mean test score and the smaller variability. The following diagram represents the ranges of the two distributions of achievement tests scores:

Method A: _____
Method B: _____

The relationship of the lines to each other indicates the overlap of the distributions. There is a greater difference between the low ends of the distributions than between the high ends, suggesting that the difference between

Methods A and B has more effect on low-scoring persons than on high scoring persons.

It is conceivable that the test scores associated with Method B were so high that only the maximum possible test score was an effective upper limit. However, a test of this hypothesis requires more data than that used in this preliminary analysis.

The particular combination of direction of difference in central tendency and direction of difference in variability used in the above example is one of five combinations that will be analyzed by comparing differences between distributions at the low ends with differences at the high ends. Examples will be provided to show the value of such analysis in interpreting research results and suggesting further research.

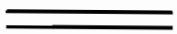
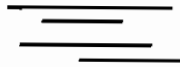
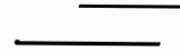
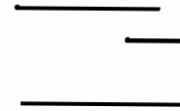
The above analysis of teaching methods and the analysis of the other situations to be discussed are based on the assumption that the rank order of the subjects under one treatment is essentially the same as it would have been under the other treatment. Experimental situations in which this assumption would be teneable are common.

The classification system shown in Table 1 categorizes situations involving two distributions arising from different treatments according to the direction of the differences in central tendency and variability. Five categories are used; (A) no difference in central tendency or variability; (B) no difference in central tendency but a difference in variability; (C) a difference in central tendency but no difference in variability; (D) differences in central tendency and variability, the direction of the differences being opposite; (E) differences in central tendency and variability, the direction of the differences being the same.

A discussion of each of the five categories will follow. It will be helpful to refer to Table 1 from time to time.

TABLE 1

Classification of Differences Between Groups According to the Relationship Between Differences in Central Tendency and Differences in Variability

Situation Designation	Diagram of Distribution Overlap	Equality or Difference	
		Central Tendency	Variability
A		Same	Same
B		Same	Different
C		Different	Same
D		Different	Different
E		Different	Different

Type A Situation

This type of situation arises when a difference in treatment has no effect on the dependent variable, but it also can occur when the difference in treatment is effective. When the size and direction of the effect of a treatment difference vary from subject to subject, independent of the position of a subject in the distribution, the central tendency and variability can remain unchanged. To illustrate, let us consider the way praise might affect the amount of studying done by college students. Assume that some students study more after being praised while other students take advantage of their good standing by studying less. Also assume that the effect of praise on a student is not related to the amount of time he usually studies. We would then find that praise causes some study times to increase and some to decrease throughout the range of study times. To the extent that the in-

creases and decreases were counterbalanced, they would have no effect on central tendency or variability. This shows how effects on individuals may be hidden under nonsignificant differences of means and standard deviations.

Type B Situation

This situation suggests that forces have pushed or pulled scores toward or away from the center of the distribution, forcing high scores and low scores in opposite directions.

While attempting to conform to social norms in buying a new car, a group of persons probably would have a closer grouping of purchase prices than before the attempt to conform. The closer grouping would indicate that people who formerly bought high priced cars paid less when conforming, while those who formerly bought low priced cars paid more.

There are numerous circumstances where the narrower distribution of a type B situation reflects increased proficiency. In learning to operate an elevator a person will overshoot or undershoot the mark considerably at first but will gradually learn through practice to stop the elevator closer to the floor level. A distribution of heights where the elevator stopped at a particular floor will become narrower as the operator becomes more proficient.

Levine and Murphy (1943) gave students reading material containing both pro-communist and anti-communist views. Students favoring communism remembered the pro-communist views better than the anti-communist views, while students opposing communism remembered the anti-communist views better; thus, the students moved farther from the neutral point on a scale of attitude regarding communism, increasing the variability of the attitudes.

Siegel and Tukey (1960) referred to a study by Ellen Tessman in which she showed a movie to two groups of subjects and measured the amount of hostility seen in the movie. The experimental group consisted of persons who, according to a personality test, had difficulty getting along with peo-

ple. The personality test scores of the control group indicated that they had good social relations. The two groups saw about the same amount of hostility in the movie ($P > .05$), but the experimental group showed more variation ($P > .01$) in the amount of hostility seen. The forces causing the people in the experimental group to have social difficulty apparently exaggerate existing perceptual tendencies, causing people who noticed little hostility to notice less and people noticing a lot of hositility to notice more.

Murphy (1962) studied the average grades of over 450 college graduates with teaching certificates. Some took teaching positions, and some did not. The average grades of the two groups were the same ($P > .05$), but the variability of the grades was greater ($P < .000001$) in the group that did not take teaching positions. The greater variability of grades in the non-teaching group cannot be attributed to greater variation in ability (assuming that ability is measured by the college entrance examination scores showed comparable variability for the two groups, as well as comparable central tendency. If the decision to take a teaching position has been made on the basis of the grade average possessed at graduation, the high correlation between grades and entrance examination scores would cause the teaching group to have a narrower range of entrance examination scores as well as grades, but, as was pointed out, this is not the case. It appears that the reasons some students took teaching positions while others took non-teaching positions were not their grades but factors that affected their grades.

Glick (1959) compared the weight gain in chickens fed a standard ration and chickens fed penicillin in addition to the standard ration. Since the average gain in weight was the same ($P > .05$), Glick concluded that the addition of penicillin did not affect weight gain. This conclusion seems to be incorrect because the chickens given penicillin had a greater variability in weight gain ($P < .001$). Penicillin, instead of having no effect, has opposite effects on low-gaining and high-gaining chickens: the penicillin decreases the gain in chickens that normally would show small gains and increases in gain in chickens that would make large gains. A chicken raiser who could

identify the low-gaining and high-gaining chickens could supplement the ration of the high-gaining chickens with penicillin and leave penicillin out of the ration of the low-gaining chickens.

Type C Situation

The nature of the overlap suggests that the difference in the effect of the two treatments is the same for high scorers as for low scorers. An example would be the shift in gross income caused by giving every employee of a company a $20 Christmas bonus, regardless of his salary.

Mills, Casper, and Bartter (1958) compared the amount of the hormone aldosterone in the blood under normal blood pressure with the amount under artificially increased blood pressure in animals having a severed vagus nerve. The increase in blood pressure increased the amount of aldosterone ($P < .001$) but the standard deviation of the amount of the hormone remained constant ($P > .05$), showing that the change in aldosterone level induced by the increase in blood pressure was independent of the level under normal blood pressure. This independence might suggest the hypothesis that the tissues producing aldosterone normally found in the blood are not the same tissues that produce the increment in aldosterone during the increase in blood pressure, but no organs except the adrenal glands are known to produce aldosterone.

Vowinckel and Orving (1962), in making computations concerning the heat flow in the Artic Ocean, assumed that Greenland-Spitzbergen border ice is 50 centimeters thicker than Denmark Strait ice every month of the year even though the ice thickness varies from month to month. If the assumption is valid, the combination of factors that causes the Greenland-Spitzbergen ice to be thicker than Denmark Strait ice has the same amount of effect when the ice is thin as when it is thicker.

Type D Situation

In this situation differences in treatment have more effect on low-scorers than on high-scorers. One circumstance that can cause this is an upper limit restricting the movement of high-scorers. Such a limit may be inherent

in the situation being measured or may be the result of limitations in the measuring instrument. As mentioned earlier in regard to the comparison of the two teaching methods, the maximum possible score on a test will constitute an upper limit.

A related explanation for a Type D situation is the existence of an upper threshold: a point above which the difference in treatment generally has no effect. For instance, suppose we were to compare the reading speed of a group of readers before and after they were given instruction in reading without movement of the vocal organs. The instruction undoubtedly would speed up the reading of many slow readers who are slowed down by saying each word to themselves. On the other hand, a fast reader presumably already knows how to read without movement of the vocal organs or he couldn't be a fast reader; consequently, the fast reader will not profit appreciably from the special reading instruction.

A type D situation also occurs when a difference in treatment has an effect that is inversely related to the rank of subjects throughout the range of scores. The Christmas bonus considered in the Type C Situation would increase the net income of the workers in inverse relation to their regular net income because of income taxes.

Malpass (1960) compared the motor development of mentally retarded children and normal children. The motor development test measured accuracy and quickness of response. The mean score of the normal children was greater ($P < .001$) and the standard deviation of the scores smaller ($P < .01$). The upper limits to accuracy and quickness inherent in measurements of distance and time conceivably could account for these results.

Type E Situation

This situation has explanations analogous to those for the type D situation. Instead of an upper limit, there is a lower limit that operates in a type E situation.

Sometimes the variability of time to perform a task is reduced as the average time can be cut down considerably, but short durations of time

can't be reduced much because of the lower limit of time duration. For example, in a comparison of two methods of teaching radio operators to translate code (3) the method giving the smaller mean time ($P < .000001$) to pass a qualifying test also gave the smaller variability of time ($P < .000001$).

A lower threshold may lead to a Type E situation. A lower threshold is a point below which individuals generally are unaffected by the difference in treatment. Compare the reading comprehension scores of a group of beginning readers provided with dictionaries and a group not provided with dictionaries. The beginning readers with poor reading comprehension would be unable to understand the dictionary, so opportunity to use it would not improve their reading comprehension. On the other hand, readers with a higher level of comprehension could understand the dictionary and thereby improve their reading comprehension scores.

A Type E situation also occurs when a difference in treatment has an effect that is directly related to the rank of the subjects throughout the range of scores.

An experimental treatment that resulted in the same amount of additional time for all readers would increase the amount read more for those who read a large amount under control conditions, i.e., the fast readers, than for those who read less.

Another example of an effect of a difference in treatment that is probably directly related to the rank of the subjects is an experiment by Mer (1959) concerning the effect of sugars added to the nutrition of young oat seedlings. There was a mean increase in length of seedlings ($P < .000001$) from the third day to the eighth day and an increase in the variability ($P < 0.001$) of length of seedlings. The large young plants grew faster than the small young plants.

The quantity of diphosophopyridine nucleotide linked enzymes in the blood of normal persons and persons with delirium tremens ("D.T.'s") was compared (Allgen, et. al., 1958). Persons with delirium tremens has more of the enzymes ($P < .001$) and a greater variability in amount ($P < .001$). A

possible lower threshold here is the minimum amount of the enzymes required in order to stay alive and healthy.

Discussion

The preceding examples are intended to show the value of joint analysis of central tendency and variability. If differences in distributions are systematically classified according to their central tendencies and variabilities, much light can be shed on the comparisons. The principal benefit of such an approach lies in the research questions raised and in the emphasis given to sound explanation and interpretation of data.

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RECENT POPULATION TRENDS AND PRELIMINARY DATA FROM THE 1981 CENSUS OF BAHRAIN

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INTRODUCTION

Rapid economic and social development usually brings about pronounced changes in the demographic characteristics of the country in which they take place. The shift from high levels of fertility and mortality to moderate or low levels, often described as the demographic transition (Stolnitz, 1964), is the concomitant of the process of modernisation, which has technological, organisational, and cultural aspects (Goldscheider, 1971). In addition to changes in vital rates, the size and structure of populations are affected by net migration, a movement of persons in response to technological and resource differentials between countries or regions (Davis, 1974). Preliminary data from the 1981 Census of Bahrain, as well as other official data provides an opportunity to look at population change in the context of rapid development using the most current information.

THE GULF REGION

However, the exact relationship between development and population change has not yet been fully explicated, and remains especially problematic in the oil producing Gulf States. Events in this region during the last decade, especially the increases in oil prices which began in 1973, have led

to an unprecedented accumulation of wealth and the anomaly of 'rich' under-developed countries. A case in point is Bahrain, a small country which in many ways typifies countries in the Gulf region. For instance, between 1970 and 1980, the total assets of the Bahrain Monetary Agency increased from 23,081,000 Dinars in 1970 to 369,300,000 Dinars in 1980, or 32 percent per year (Statistical Abstract, 1981). Moreover, more than 92 percent of these assets were earned through foreign exchange, primarily through the sale of petroleum products. During a roughly comparable period, 1971-81, in which assets were growing at 32 percent per year, the population of Bahrain was growing at a rate of 5.09 percent per year. In terms of both capital accumulation and population increase, these trends are phenomenal by world standards, reflecting the unique conditions of the Gulf region.

The assertion that Bahrain in many ways typifies the Gulf region, is supported by two demographic facts. First, the overall growth rate of 5.09 percent is quite similar to the figure of 5.2 estimated for the region as a whole (United Nations, 1978). Second, Bahrain's proportion of foreign population of 31 percent is similar to the average foreign population for the six oil producing states combined of 28.2 percent (Birks and Sinclair, 1980).

In order to place recent population changes in Bahrain in perspective, it is useful to look at the census figures over the past 40 years. The figures provided in Table 1 indicate the basic dynamics and changing nationality composition since World War II to the present.

TABLE 1

POPULATION CHANGE IN BAHRAIN 1941-1981

Nationality	1941	1950	1959	1965	1971	1981
Bahraini	74040	91179	118734	143814	178193	242100
Non-Bahraini	15930	18471	24401	38389	37885	112795
TOTAL	89970	109650	143135	182203	216078	354895
% Bahraini	82.29	83.15	82.95	78.93	82.47	68.22
% Non-Bahraini	17.71	16.85	17.05	21.07	17.53	31.78

Table 1 shows the intercensal change, in both numbers and percent of the population of Bahrain, both native and foreign. As indicated,the total population of Bahrain has increased from 89,970 in 1941 to 354,895 in 1981, or nearly four fold during the 40 year period. This increase corresponds to an average annual rate of increase of 3.5 percent over 40 years, an extremely-high rate by historical standards, one seldom duplicated even in the poorest of countries. It is however, the component parts of this growth which demonstrates the unique character of population change in Bahrain, and to a great extent, other Gulf states. As seen in Table 1, the percentage of foreign population in Bahrain from 1941 to 1971 remained at approximately 17 to 20 percent. During the last decade however, the percentage of foreign population has nearly doubled, increasing from 17.5 percent in 1971 to nearly 32 percent in 1981. While some of this increase in the foreign population is attributable to natural increase, the largest proportion is the consequence of migration of foreign workers into Bahrain in response to the demand for labour created by the rapid development of the national infrastructure. The excess revenue generated by petroleum price increases has allowed Bahrain, as well as other rich Gulf states, to embark on massive public building programs such as low cost housing, roads, schools, hospitals, office building, sanitation systems, water and electrical supplies. Futher, in an attempt to diversify the national economy, the

Government of Bahrain has invested in ship-building yards, aluminium production facilities and other industrial enterprises.

FUTURE TRENDS

This rapid influx of foreign population in response to development, coupled with a high rate of natural increase of Bahrainis, will have several long-term consequences if present trends continue. The effect of these trends can be conveniently labelled 'Overall Growth', 'Natural Increase', and 'Differential Growth'.

TABLE 2

ANNUAL RATES OF CHANGE (PERCENT) 1941-1981*

Nationality	1941-50	1950-59	1959-65	1965-71	1971-81
Bahraini	2.52	2.92	3.30	3.36	3.11
Non-Bahraini	1.64	3.08	7.98	− .22	11.53
TOTAL	2.20	2.95	4.18	2.82	5.09

OVERALL GROWTH

If the intercensal growth rate for the total population of 5.09, as shown in Table 2, were to continue, the population of Bahrain will double in about 14 years. Being an island state, Bahrain is faced with both ecological and technological limits. During the 1971-81 period, the density of the island has increased from 323 to 530 persons per square kilometre, comparable to the most densely populated countries of Europe (ECWA, 1979). This increased density has already had some adverse environmental impact, evidenced by a drop in the water table, increased salinisation of fresh water and a decline in agriculture (ECWA, 1979). Moreover, the population of Bahrain is not evenly distributed, but is highly concentrated in the northern

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★ Calculated by $\log (1 + r) = \frac{\log P_2 - \log P_1}{N}$

third of the Island, principally in Muharraq and the Capital, Manama. According to U.N. estimates, more than 75 percent of the population of Bahrain lived in these two areas in 1978, and one Arab scholar has categorised Bahrain as one of the 'Ultra-urban' Arab States (Omran, 1980). Preliminary data from the 1981 Census shown in Table 3, suggests that Bahrainis, in response to the recent availability of low-cost housing in outlying suburbs, are beginning to decentralise. Conversely, the foreign population in the Capital of Manama has increased 228 percent between 1971 and 1981, increasing their proportion of the population of the City from 33.4 to 52.4 percent. A more detailed illustration of the trends in population distribution are shown in Table 3.

The shift in the proportionate distribution of the population between 1971 and 1981, shown in this table, indicates a substantial decentralisation of the population, with the greatest growth taking place outside Manama and Muharraq. Since further large scale housing projects in the Southern portion of the Island are now under construction, a continuation of this process is expected. One unanticipated consequence of this distribution pattern has been an enormous increase in traffic from outlying areas to the commercial and industrial areas of Manama. Government efforts are presently focused upon means of alleviating the transportation problems that growth and decentralisation have engendered (Ministry of Transportation, 1980).

NATURAL INCREASE

Even if there were substantial curtailment of immigration due to deliberate government policy, the population of Bahrain will continue to grow through natural increase. Inasmuch as the net migration of Bahrainis is negligible, the 1971-81 rate of increase of 3.11 for Bahrainis, shown in Table 2, can be considered nearly all natural increase (Statistical Abstract, 1979, 1980). Although Table 2 indicates a decline in the growth rate for Bahrainis since 1959, which is consistent with the argument that Bahrain is in the process of the demographic transition (Deming, Van Arsdol, Jr.et.al. 1979), the percent rate of growth of 3.11 is high by world and regional standards. To illustrate, the world population growth rate is estimated to be

TABLE 3

DISTRIBUTION OF THE POPULATION OF BAHRAIN
FOR SELECTED AREAS, BY NATIONALITY (1971-1981)

Area	Year	Bahraini	Per-centage	Non-Bahraini	Per-centage	Total	Per-centage
Muharraq &	1971	45774	25.7	3766	9.9	49540	22.8
Hidd	1981	53510	22.1	14371	12.7	67881	19.1
Manama	1971	59496	33.3	29903	78.9	89399	41.3
	1981	61985	25.6	68315	60.5	130300	36.7
Isa Town &	1971	13946	7.8	282	> 1.0	14228	6.6
Central Region	1981	33658	13.9	4557	4.0	38215	17.7
Jidhafs &	1971	29519	16.5	616	1.6	30135	13.9
Northern Region	1981	46595	19.3	9494	8.4	56089	15.8
Sitra, Riffa &	1971	29458	16.5	3318	8.7	32776	15.2
Western Region	1981	46352	19.1	16058	14.2	62410	17.5
Total	**1971**	178193	**100**	**37885**	**100**	**216078**	**100**
	1981	**242100**	**100**	**112975**	**100**	**354895**	**100**

1.79, an average of 0.7 for the developed nations and 2.1 for the under-developed nations (U.S. Census Bureau, 1980). Sub-regionally, the South-Western Asian region, which includes all the Gulf States, is growing at a rate of 3.1, which exceeds all the other sub-regions in the world (U.S. Census Bureau, 1980).

The high rate of natural increase in Bahrain, as well as other countries in the Gulf region, is the result of high birth rates and rapidly declining mortality rates. In combination, these vital rates create a population with a very young age structure and a high dependency ratio. According to the 1971 Census of Bahrain, children under 15 years old comprised 48 percent of the Bahrain population. Given the high birth rates and declining death rates which have prevailed over the past decade, it is reasonable to assume that persons under 15 now constitute more than 50 percent of the Bahraini population. According to Omran (1980), rapid population growth and high dependency ratios have required Arab states to expend a disproportionate share of national wealth in 'demographic investment' – activities to cope with the increasing population in an attempt to maintain the same standard of living and prevent it from deteriorating. A case in point is Bahrain's indigenous school population, which has increased from 46,200 to 65,368 in the last decade, at a rate of more than 3.5 percent per year. At this rate, Bahrain will have to double the number of teachers employed and have twice as many classrooms as are presently available in just 20 years, in order to maintain present class size and student-teacher ratios. More striking than the growth of school population, however, is the growth of government expenditure for education, In the last ten years, government expenditures have risen from 12,473,000 to 155,632,000 Dinars, or 28.7 percent a year (Statistical Abstract, 1981).

DIFFERENTIAL GROWTH

Of the various demographic factors indicated by the preliminary data from the 1981 Bahrain Census, perhaps the most intriguing and certainly the one most fraught with policy implications, is the differential growth rate between the Bahraini and foreign populations. As shown in Table 2, bet-

ween 1971 and 1981, the Bahraini population increased at an annual rate of 3.11 percent, while the foreign population increased at a rate of 11.53 percent. If these two populations were to continue to increase at these respective rates until the 1991 Census, the total population will be 664,776 and Bahrainis would constitute a minority of 328,945 or 49 percent of the total population.

While it may be argued that government policy can mediate the magnitude of the foreign population, historical evidence indicates that in the Gulf regions, the demands of rapid development in order to 'modernise' national infrastructures, requires an ever increasing importation of foreign manpower. At present, all the oil-producing Gulf states have sizeable foreign populations, and in three cases, Kuwait, Qatar, and the United Arab Emirates, these constitute absolute majorities of 60,59 and 80 percent respectively, (Birks and Sinclair, 1980).

One of the more problematic features of the growth of these foreign populations is the extent to which they may become permanent residents rather than guest workers. As foreign populations increase in absolute size and relative proportion, the indigenous economy becomes increasingly dependent upon them as the infrastructure increases in scope and complexity. With the modernisation of the infrastructure, there is an increasing growth in the tertiary sector of the economy (Evans and Timberlake, 1980). To a great extent, the nature of labour in the tertiary sector involves operations and maintenance, which unlike construction workers who can be returned to their country of origin at the completion of a particular project, requires personnel to operate and maintain hospitals, schools, hotels, factories and utilities for long periods of time. A recent labour force survey in Bahrain has noted that while construction remains the largest sector of the economy, the tertiary sector is at present sizeable and growing at a faster rate than either the primary or secondary sectors (Ministry of Labour and Social Affairs, 1979).

A second distinguishing feature of current immigration is the changing characteristics of foreign workers. In the past, the bulk of migration in the

Arab region has been from the poor Arab states to the oil-producing countries. Recently the trend has been towards greater numbers of Indians, Pakistanis, and other Asian groups arriving to meet labour demands. For instance, according to the 1971 Census of Bahrain, Omanis were the largest number of foreigners in the labour force at the time (Ministry of Finance, 1971). Conversely, the latest labour force survey indicates that 63 percent of the total labour force is Asian. The most significant individual nationality is that of Indians, who account for more than one third of the labour force. In addition, Pakistanis account for another 19 percent (Ministry of Labour and Social Affairs, 1979).

In short, changes in the structure of the economy through modernisation, which alters the length of stay for foreign workers, the unequal growth rates of Bahrainis and non-Bahrainis, and the changing nationality characteristics of the foreign population may result in a future population in Bahrain which is predominantly non-Bahraini, and moreover, non-Arab.

SUMMARY AND CONCLUSIONS

This brief analysis of the most recent trends in population change in Bahrain must be accompanied by two important caveats. First, the 1981 Bahrian Census data used were compiled by hand tallies on a day-to-day basis during the Census, and should be perceived as preliminary counts. Some minor adjustments through editing and imputation procedures during computer processing are likely. The basic trends discussed, however, will remain unchanged and will not be significantly altered in magnitude or direction.

The second caveat concerns the imprecision of forecasting the future based on past trends. The pace and scope of material and social change taking place in the Gulf have no historical antecedents elsewhere. Economic development and demographic change in this region do not fit the classical Western model, in so far as conditions which took 50 to 100 years to evolve in the Western world have been compressed into a few short decades. This rapid pace of development is in part the result of the ease of transfer of Western technology and expertise to the Gulf region. More

important has been the willingness of Gulf Governments to allocate economic resources and to formulate policies to encourage this development. Thus any estimation of the future population of Bahrain, both in size and composition, rests on assumptions of a continuation of present development and investment policies of the Government. At the same time, it should be noted that the possible scenarios regarding the future demographic parameters of Bahrain are not unreasonable in the context of contemporary history in the Gulf region.

To summarise the salient features of this analysis, recent population changes in Bahrain reflect the development process of the Gulf region as a whole, and are marked by high rates of overall growth, high rates of natural increase, and increasing proportions of non-nationals. In substantive terms, continuation of present trends may impinge upon ecological and physical limits, call for increasing demographic investment to support a high dependency ratio, and many of the benefits of economic development may accrue to a population substantially non-Bahraini and increasingly non-Arab.

In conclusion, should the Government of Bahrain and other Gulf States continue to pursue a policy of rapid development, then a number of challenges as well as opportunities will confront the people of this region. The social problems which are often exacerbated when people of diverse linguistic, cultural, and religious backgrounds come into economic competition will need to be dealt with. A further diversification of the economy and a lessening of dependence upon petroleum exports is imperative if these economies are to remain viable when oil reserves are exhausted. Finally, there will need to be some fundamental institutional and ideological adjustments to avoid what Ogburn (1922) has described as 'cultural lag', that is, the temporal disjuncture between modern technological innovations and the cultural adjustments necessary to maintain the integrity of the society.

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