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Shifts in Social Development and Fertility Decline in Iran: A Cluster Analysis of Provinces, 1986-1996

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Abstract

Iran is experiencing the third phase of demographic transition (low levels of birth and death), following a sharp fertility decline experienced during 1986-1996 period and is still underway. Using the analytic framework of Davis and Black, we examined the impact of social development and contraceptive prevalence, respectively as the structural and proximate determinants, on rapid fertility decline in Iran. We found that the social development level of provinces had a great impact on fertility decline through contraceptive prevalence indirectly. The cluster analysis of social development indices in 1986 and 1996 revealed that 15 out of 24 provinces of Iran moved from a lower developed status in 1986 to a moderate or a higher developed status in 1996 (twelve provinces moved from a "less developed" state in 1986 to a "moderate developed" state in 1996, and three provinces moved from a "moderate developed" state in 1986 to a "developed" state in 1996). In addition, regarding to the social development levels and fertility rates, the gap between provinces decreased during 1986-1996. That is, a shift from heterogeneous to more homogeneous patterns of social development and fertility occurred across Iran's provinces during 1986-1996.

Introduction

Iran has already experienced a remarkable decline in fertility. The sharp decline in fertility occurred during the 10- year period of 1986-1996: total fertility rate per married women declined from 6.2 in 1986 to 3.3 in 1996 and to 2.5 in 2001(SCI, 2000b; SCI 2001). This demographic miracle made Iran's population enter to the third stage of fertility transition with a low fertility and mortality levels.

Five distinctive stages are recognized in Iran's fertility transition; they imply different trends of fertility change (see Table 1 and Figure 1). In the period before 1946, the crude birth rate was relatively constant around 40 per thousand populations, but in the second stage, during 1946-66, crude birth rate increased steadily from 40.7 to 48.6 per thousand populations. Thus, the absolute number of population mounted from 14.2 to 26.0 million during this period (SCI, 2000a). That is, 83.1 percent of population was added to Iran's population during this 20-year period.

A modest fertility transition can be seen during 1966-76 when the crude birth rate decreased from 48.6 live births per thousand in 1966 to 40.1 per thousand in 1976.This decrease implies an average annual population growth rate of 2.7 percent, compared to the average annual growth rate of 3.2 percent in the preceding decade (1956-60). The absolute number of population increased from 26.0 to 33.7 million during this stage (SCI, 2000a). In contrast fertility increased from 40.1 live births per thousand populations in 1976 to 50.2 per thousand in 1986. As a result, the absolute number of population rose from 33.7 million in 1976 to 49.4 million in 1986 (SCI, 2000a). It means that 46.6 percent of population was added to the Iranian population during this 10-year period, something more than half of the increase in the first stage within a 20-year period.

The sharpest fertility decline occurred in the last stage, starting from1986 and still in progress. During this period, crude birth rate fell from 50.2 in 1986 to 26.5 per thousand populations in 1996. Therefore, the absolute number of population changed from 49.4 million in 1986 to 60.1 million in 1996 (SCI, 2000a). In other words, 21.6 percent of population was added to the overall population of the country in 1996.

--Table 1 and Figure 1 about here --

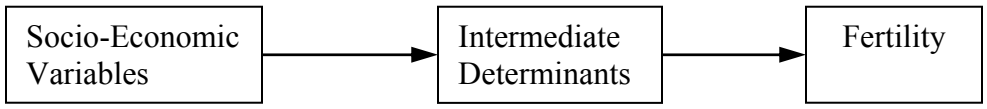
The declining trend of fertility has been continuing after 1996. It is estimated that the crude birth rate has already decreased from 26.5 live births per thousand populations in 1996 to 18.3 in 2001(SCI, 2001). Furthermore, it has been suggested that four provinces,

namely Esfehan, Gilan, Semnan, and Tehran, have already experienced below replacement level fertility (Abbasi, 2001).

Such rapidity in fertility decline makes Iran an interesting case among developing countries for examining determinates of rapid fertility decline. This study intends first to examine changes occurred in the social development of provinces during 1986-1996 and then to examine the relationship between social development levels of provinces and fertility decline in Iran. In the following, first theoretical perspectives and past researches are argued, and after that the conceptual model and hypotheses are developed. In the section of results, first the impacts of structural and proximate determinants of rapid fertility decline across provinces will be investigated, using regression and path analyses. Then, a cluster analysis of social development indices will examine shifts in the social development patterns provinces during 1986-1996, and at the end the findings will be discussed.

Theoretical Framework

Davis and Blake (1956) defined a set of direct fertility determinants know as "intermediate variables" through which structural variables influence fertility behavior. Their model can be simply illustrated as follows:



Several studies have used this model to examine the impacts of structural and proximate determinants of fertility level at national level as well as variations in fertility across sub-populations and socio-economic groups. Mauldin (1988), for instance, explored that socio-economic settings explain 23 percent of fertility decrease indirectly through family planning program (intermediate factor), while family planning program can directly

explain 44 percent of fertility decrease by itself. Developing Davis and Blake's model, Bongaarts (1978) found that variations in marriage, contraceptive and induced abortion are the most important sources of fertility differentials in the United States and Korea. Martin (1996), who applied the model of Davis and Blake, also found that variation in age at marriage, as the other intermediate variables, played a strong role in decreasing fertility.

Regarding the influence of structural factors on fertility behavior, some studies have shown that unequal development can accelerate socio-economic inequality among the subpopulations in a society and hence increase variation in fertility. Gonzales-Cortes (1981), for instance, pointed out the result of a study on the development strategies and population policies, implemented by CELADE. According to one part of this study, in those parts of Latin America where a socialism-oriented development program had been implemented, the structural heterogeneity was very small; therefore, fertility decline across all subpopulations (provinces, cities, etc.) was homogeneous. In contrast, in those countries which experienced a capitalism-oriented development program, the structural heterogeneity was very deep; thus, considerable differences in fertility are seen across subpopulations.

Amirahmadi and Atash (1996) showed that Iran's provinces during 1956-1984 have developed unequally. They concluded that Iran's provinces can be categorized in three groups in terms of their development levels: relatively developed, middle and less developed provinces. As a result, they suggested that this pattern of development has been sustained with a little change, even after the Islamic Revolution occurred in 1978. Their analysis on provinces is limited to the decade just after the Revolution (1978-86) and did not go beyond this categorization and did not examine demographic changes that might be related to such an unequal development pattern. In effect, as Mirzaie (1998) described, the "swings" in fertility change should be examined in the context of socio-economic and policy changes occurred during the last three decades in Iran.

The development strategies implemented before the 1978 Islamic Revolution was mainly oriented to a Western-capitalist model. Although in this period (1966-1976) there was a significant fertility decline, but Iran's provinces developed unequally. A few provinces, such as Tehran, the capital city, as the core provinces developed and modernized, but the rest of provinces which held mainly a rural structure, remained less developed and deprived. Such pattern of development persisted across provinces even during the decade after the Revolution when the eight- year war between Iran and Iraq took place and most of resources were allocated to war, instead of to developing the provinces.

After ending the war in 1988, the new *Constructive* government implemented the first and the second new five-year social, economic and cultural development plans respectively in 1989-1994 and 1994-1999. These plans included two important aims: 1) targeting social development of rural and remote areas and 2) implementing an extended-joint national family planning and health program so as to control rapid population growth and to improve the health standards across provinces. In fact, the core ideas behind these programs were to diminish the wide gaps between rural-urban, core-peripheral, and developed-underdeveloped areas across the country.

We, therefore, hypothesize that Iran's provinces approached an equal pattern of social development in 1996, compared to the unequal pattern of development in 1986. That is, the standards of living in the rural and remote areas improved, and the gap between provinces in terms of social development indicators decreased. This pattern of development as well as some other macro factors, such as the economic hardship followed the imposed war and the support of religious leaders for legalizing contraceptive use, were precursors for making people's attitude "ready" to acceptance the freely "available" family planning services. Therefore, the significant enhancement in the

standards of life indirectly, through the high prevalence of contraceptives, affected fertility across provinces. Using Davis and Blake's model (1956), the above mentioned hypothesis will be examined. In addition to indirect effect of structural variables on fertility, one direct path also is added to the conceptual model so as to compare the contributions of direct and indirect effects of social development of provinces on rapid fertility decline. The conceptual model is depicted in Figure 2.

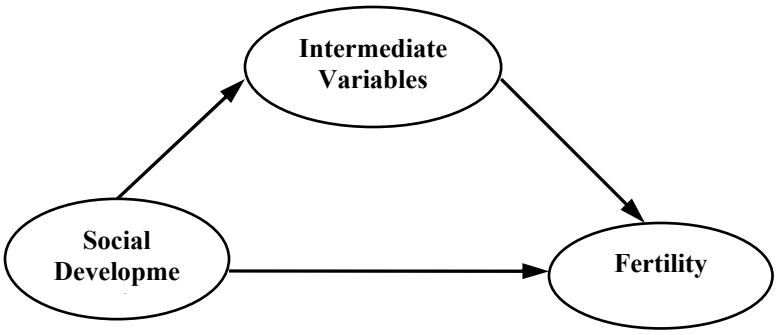


Figure 2. Conceptual framework for analyzing fertility decline in Iran

Methodology

The province-specific data regarding different social indicators, fertility and contraceptive prevalence rates, which are based on the results of 1986 and 1996 census and some KAP surveys, were taken from measures estimated by Statistical Center of Iran (SCI) and other published researches (Zanjani 1991; SCI 2000c; Mehryar 2001; SCI 1988). Based on these data, the dependent, intermediate and independent variables in our model will be measured.

Fertility as the only dependent variable was measured by crude birth rate (CBR), and the percentage of using contraceptives among married women aged 15-49 is the intermediate

variable through which the impact of social development on fertility operates. As improvement of the standards of life through the whole provinces, especially the rural and deprived areas, have been the major concerns of the two five-year national social, economic, and cultural development plans, implemented respectively in 1989-1994 and 1994-1999, social development levels of provinces were chosen as independent variable in the model. Various definitions of "social development" have been already proposed[1], so there is no agreement on the definition as the measures of the concept range from quantitative indictors, such as provision of the basic needs and services, to qualitative processes, such as democratization. However, the core elements in most of the definitions are "improvement of life standards" and "empowerment of poor people" through interventions of governments and agencies by establishing and executing equitable initiatives. Relying on these core ingredients, we use four indicators, namely life expectancy at birth (E_0), infant mortality rate (IMR), literacy rate of women aged 15 and over (EDU), and urbanization (URB) to construct the index of social development levels of provinces. Each of the indicators has a range wherein the minimum and maximum values indicate the lowest and highest level of development respectively, except the indicator of infant mortality rate which functions inversely (see Table 2). Harmonizing it with the other indicators, we subtracted 100 from the value of infant mortality rate for each province. The new indicator is composed of the minimum and maximum points indicated the lowest and highest level of development. The results of factor analysis of the four indicators revealed that the four indicators of social development index contribute to the index (latent factor) unevenly, with different weights[2]. The weights of indicators used here are basically the factor scores plus number one; where the indices of social development for each province in both years (say, 1986 and 1996) are computed as follows:

[1] For instance, look at the list of definitions presented in a report of World Bank posted in 2002 on www.worldbank.org/oed/sdstudy/design_paper.pdf

[2] The explained variance of social development index for 1986 and 1996 are respectively 69.2 and 74.5 percent. The KMO values for 1986 and 1996 indices are respectively .65 and .80.

$$\text{Social Dev. (1986)} = (1.305E_0 + 1.276URB + 1.346EDU + 1.270IMR)/4$$

$$\text{Social Dev. (1996)} = (1.293E_0 + 1.264URB + 1.301EDU + 1.300IMR)/4$$

The results are shown in the last two columns of Table 2. The values of the index can range between 0 and 100, where 100 denote a very highly developed province and 0 signifies a very highly underdeveloped one. Kurdestan province with index value of 28.0 in 1986, for instance, was the least developed province in Iran, while Tehran with values of 93.3 was the highly developed province at that time. It is clearly seen that the index values pertaining to all provinces significantly improved in 1996.

-- Table 2 about here --

The investigation of the conceptual model requires some relevant path coefficients which are obtained from some regression structural equations. It should be noted that the conceptual model will be examined only for 1996 as there was no available data regarding contraception for 1986. To demonstrate changes occurred in the social development patterns and status of provinces in one decade from 1986 to 1996, we apply cluster analysis method on the scores of indices of social development.

Results

Based on the analytical model presented in figure 3, it is considered that the direct effect of social development levels (DEV) of provinces on the crude birth rate (CBR) is -.27. The negative sign indicates that the more socially developed, the lower is fertility of provinces.

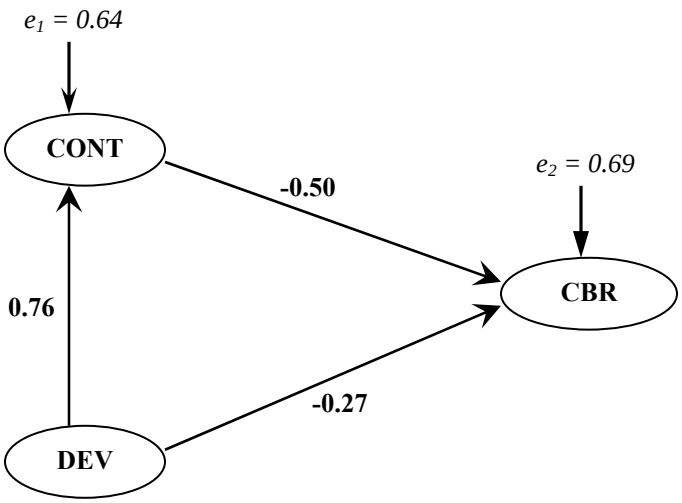


Fig.3.The analytical model for fertility decline among 26 provinces, Iran 1996

Referring to the research hypothesis and Davis and Black assumption, the socio-economic environment has more indirect impact on fertility decline. Thus, the indirect effect of social development (DEV) on fertility is -0.38 (= -0.50 * 0.76). The indirect impact of social development levels of provinces on fertility decline is obviously more than the direct impact of that.

The total direct and indirect effects of social development level of provinces on fertility decline is equal to -0.65 (= -.27 + (-.38)). That is, the model could explain a high percent of the overall relationship between social development of 26 provinces and their fertility levels in 1996. In fact, population of a province with a lower crude birth rate are usually more literate, lives more in urban areas, and has a higher life expectancy and lower infant mortality and vise versa (see Table 2). In the following, we further elaborate shifts from unequal to more equal social development of provinces occurred during 1986-1996, and to introduce clusters of provinces, in terms of their social development levels, that would be useful for future researches.

Shifts in social development status of provinces

Social development patterns of provinces in 1986 and 1996 have been illustrated in figures 4 and 5, clustering the scores of social development indices by SECLID measure (Squared Euclidean Distances) as one of the method of cluster analysis. This measure computes the distance between two cases (provinces) by the square root of the sum of the squared differences in values on each variable. That is, Distance (x, y) = $\sqrt{\sum}$ ((Xi -Yi) **2) (Bartholomew and et al, 2002: 28).

The cluster analysis of the scores of social development index pertaining to provinces in 1986 (see Figure 4) distinguished three clusters, where provinces with the relative identical development levels fell into one single cluster. As Figure 4 shows, provinces numbered 14, 15, 5, 20, 11,16, 28, 3, 25, 18, 12, 21, 2, and 10 are the members of a large cluster which has the lowest average score of development index (say, 50.4), compared with other two clusters; therefore, we label this cluster as *"less developed"* provinces. Similarly, provinces numbered 4, 17, 22, 6, 13, 27, 24, and 8 fell in one other single cluster, with an average index scores equals to 67.9 which is 25.8 percent more than that of less developed provinces; thus, we call this cluster as *"moderate developed"* provinces. The last province, i.e., Tehran, is the only province fall into the third cluster, with a relatively high score (93.3), so we label it as *"developed"* province. We can clearly see in Figure 4 that the distance between the less and moderate developed clusters are shorter than that between the less developed and developed clusters; this is why they have joined in one main branch. In contrast, the distance between the developed cluster and two other ones is substantially large because it has located in a separate main branch. Furthermore, the province numbered 19 has the lowest development score, i.e., 28.0, and has fallen into a single branch cluster. These two single-member clusters, namely Kurdestan and Tehran, are respectively the most deprived and modern provinces in 1986.

This fact implies of existing a highly heterogeneous patterns of social development among provinces.

-- Figure 4 about here --

Following implementation of the government's development plans and national family planning and health programs after 1986, the social development status of provinces changed drastically (see Figure 5). If Figure 5 is compared with Figure 4, it will be considered that social development status of some provinces has significantly changed. Cluster analysis of the scores of social development index for 1996 also revealed three distinctive clusters of provinces. The first cluster consists of six provinces numbered 13,23,27,26, and 24, which are the most developed provinces in Iran, with a very high average score of 96.2, so we label it *"developed"* cluster of provinces. In addition, eighteen provinces numbered 5,10, 28,12,20,15,22,,4,14,16,1,3,11,2,17,6,8, and 21are fallen into another cluster of provinces, with an average score of 80.3; thus, we name this cluster as "moderate developed" cluster of provinces. The last cluster, which is composed of three provinces numbered 18, 19, and 25, has the lowest average score of social development index (67.2), compared to other two clusters. Hence, it is named as *"less developed"* cluster. The difference between the average scores of "less developed" and "developed" clusters of provinces in 1986 and 1996 are respectively 42.9 and 29.0. In addition, the difference between the "moderate developed" and "developed" clusters of provinces in 1986 and 1996 are respectively 25.4 and 15.9. This means that the gap between provinces in terms of levels of social development has decreased between 1986 and 1996, and hence provinces moved from heterogeneous to more homogeneous patterns of social development. Comparison of the means and standard deviations pertaining to the indicators of the indices depicted in Table 2 obviously show such considerable shifts in social development of provinces.

-- Figure 5 about here --

In general, the number of provinces with "moderate developed" status has increased in 1996, compared with that in 1986. To examine this change more precisely, we have

developed a turnover table, based on the results of two dendrograms depicted in Figures 4 and 5 (see Tables 3). The results of Table 3 show a large off-diagonal changes in the development status of twelve provinces which have moved from "less developed" status in 1986 to "moderate developed" status in 1996. In addition, the development status of three other provinces, namely Esfehan, Yazd, and Semnan, has changed from "moderate developed" in 1986 to "developed" status in 1996. Therefore, social development status of 15 out of 24 provinces improved from 1986 to 1996, and the status of the rest of provinces have not changed during this period.

-- Table 3 about here --

Similarly, fertility levels of provinces have changed from a heterogeneous to homogenous patters between 1986 and 1996 (see Figure 6). The results of Figure 6 show a linear association between social development levels of provinces and their fertility rates. It is clearly seen that 1996 scatter plots are more convergent both horizontally and vertically than 1986 ones. This indicates that fertility have declined in all provinces along with improvements in social development levels of provinces.

-- Figure 6 about here --

Other evidences further support our hypothesis. As mentioned beforehand, implementations of various styles of development strategies and government national policies before and after the Islamic Revolution in Iran led to different demographic outputs. Before the 1978 Islamic Revolution, Shah implemented a western-style development policy. As a result, heterogeneity was intensified among subpopulations. Then, after revolution, the new government made special attention to the deprived areas (i.e., rural and remote areas). The new government's policy was based on the Islamic thought as to all members of a society have equal rights to hold a good quality of life. Therefore, "soon the *Constructive Jihad Organization* was established to revive and develop the economic and social conditions of the villages and deprived regions. The activities of the organization ranged from providing educational and health services to constructing roads and dams, and to distribution of agricultural machinery and

equipment. This contributed to the establishment of a sound and healthy rural environment after the revolution, and made rural areas of Iran significantly different from those of other countries in the region" (Abbasi, 2002: 428).

In spite of the eight–year war with Iraq which started in 1979 and consequently led to an economic hardship, the new government's policy could slightly diminish heterogeneity in social development levels of subpopulations. From 1976 to 1996 the quality of life in urban and especially rural areas simultaneously improved. For example, the proportion of rural households having clean water rose from 21.5 percent in 1976 to 71.1 percent in 1996. Similarly, the proportion of households in rural areas having electricity increased from 14.2 percent in 1976 to 88.5 in 1996. The same upward trends can be seen for access to telephone, and literacy rate (see Tables 4 and 5). For instance, the literacy rate of population aged 6 and over in rural areas which was 30.5 percent in 1976, mounted to 69.3 percent in 1996, and the gap between rural and urban areas in terms of literacy rate reduced from 35.0 and 25.1 percent respectively in 1976 and 1986 to 16.4 percent in 1996. Therefore, the wide gap between urban and rural areas regarding household access to clean water, electricity and telephone, and literacy rate considerably diminished from 1986 to 1996 in the face of an approximately constant growing rate of urban population (SCI, 1999: 15).

-- Tables 4 and 5 about here --

As to the reduction in fertility differentials, provinces have shifted to a more convergence pattern. For instance, the differences between the crude birth rates of Sistan, with the highest fertility level, and Gilan, with the lowest fertility, decreased from 22.5 in 1986 to 19.97 in 1996; such reduction is also reflected in the standard deviations of their crude birth rates ranging form 5.6 in 1986 to 4.7 in 1996 (see Table 2). Thus, Iran's provinces have been approaching more convergence fertility patterns.

The government policies as well as the economic hardship after the war, therefore, generated some rapid structural changes in society. These rapid changes imposed immediate forces on the cost of living, especially costs of childrearing and increased the expectations of families to put more emphasis on the quality rather than quantity. In effect, this condition has been a powerful precursor for the great achievement of the 1989 national-joint family planning and health program in reducing infant mortality and total fertility rates across the country. This is why Iran's family planning program is called a "Responding to a Nation's Needs" (Roudi–Fahimi, 2002); the needs which were generated by the rapid socio-economic changes.

Summary and Discussion

The main objective of this paper was to explore the relationship between change in the social development status of provinces during 1986-1996 and rapid fertility decline. The results of a cluster analysis conducted on the scores of social development index showed that twelve provinces moved from "less developed" status in 1986 to a "moderate developed" position in 1996. In addition, three provinces shifted from a "moderate developed" status to a 'developed' status, and the gap between the three social development states (less developed, moderate developed, and developed) decreased from 1986 to 1996. Therefore, we conclude that Iran's provinces have already shifted form a heterogeneous to more homogeneous patterns of social development. Our further findings suggest that the same shifts simultaneously occurred in fertility levels of provinces. That is, shifts to homogeneous patters of social development have been accompanied with changes from divergent to convergent patters of fertility across provinces.

To further explore this link, we analyzed the impact of social development levels of provinces on fertility decline directly as well as indirectly through contraceptive prevalence rate in 1996, using analytic framework of Davis and Black and existing data.

Consistent with our conceptual model, we found that the indirect impact of social development levels of provinces through contraceptive prevalence rate is much greater than the direct impact of that. This is probably an indication for salience role of social development in reducing fertility, compared with the role of contraceptive. The analysis of the results of 1986 census support our conclusion as they show that fertility started to decline in the whole country before implementation of the 1989 national family planning and health program (Mirzaie et al, 1996). Caldwell (1997) also suggests that socio-economic changes in every fertility transition is a precursor that brings fertility in people's economic calculus; then, the cultural and ideological debates on the status and roles of women within family and society, pros and cons of large family size, and contraceptive use taken place at the macro level among intellectuals, religious leaders, and politicians would make people's attitudes ready to practice fertility control. This is what happened in Iran after ending the eight-year war between Iraq and Iran.

First, the paradoxical situation resulted from social development of rural and remote areas along with the economic hardship followed the war made people's fertility decisions come to their economic calculus due to both their growing expectations and the poverty resulted from economic hardship; the former is similar to this notion that "development is the best contraceptive", and the later follows an idea similar to "Malthusian de pauvrete". Then, after revealing the results of 1986 census which showed a high population growth rate for Iran, the scientific, cultural and ideological debates on population control, legalization of contraceptive use and sterilization were taken place among professionals, clergies, and politicians. These debates ultimately led to the establishment of 1989 family planning and health program which was a punctual "responding to a nation's needs".

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Table 1 – The crude birth and death rates, and the average natural growth rate of population; Iran 1876-2001

Years	Crude Death Rate (1000)	Crude Birth Rate (1000)	Average Annual Natural Growth Rate (1000)
1876-1881	36.1	40.1	~ 4
1881-1886	36.0	40.0	~ 4
1886-1891	36.0	40.0	~ 4
1891-1896	36.1	40.1	~ 4
1896-1901	36.0	40.0	~ 4
1901-1906	35.7	40.0	4.27
1906-1911	34.2	39.9	5.74
1911-1916	33.0	39.7	6.66
1916-1921	32.9	39.6	6.66
1921-1926	32.8	40.5	7.72
1926-1931	31.7	40.6	8.95
1931-1936	28.2	40.2	12.03
1936-1941	25.5	39.4	13.95
1941-1946	24.5	40.7	16.18
1946-1951	26.8	45.6	18.76
1951-1956	23.7	48.9	25.22
1956-1966	17.0	48.6	31.6
1966-1976	13.0	40.1	27.1
1976-1986	14.2	50.2	36.0
1986-1991	9.9	34.4	24.5
1991-1996	6.5	26.5	14.7
1996-2001	6.3	18.3	12.0

Sources: Figures before 1996 were taken from Amani (1995); figures during 1996-2001 were taken from SCI (2000c and 2001).

Table 2. Selected social development indicators; Iran's provinces, 1986 and 1996

Province	Crude Birth Rate (1000)		Life Expectancy at Birth (Year)		Infant mortality Rate (1000)		Urbanization %		Female Literacy Rate %		Scores of Social Development Index	
	1986 (1)	1996 (2)	1986 (3)	1996 (4)	1986 (5)	1996 (6)	1986 (7)	1996 (8)	1986 (9)	1996 (10)	1986 (11)	1996 (12)
Ardebil	NA.	23.99	NA.	60.79	NA.	45.8	NA.	54	31.4	64.9	NA.	75.4
Azarbayejan E.	40.9	18.30	56.20	66.52	96.7	42.8	49	64.8	41.7	68.2	48.9	82.7
Azarbayejan W.	41.6	24.27	57.90	64.58	103.6	48.1	46	57.3	34.3	58.7	43.9	74.9
Bushehr	47.5	23.36	56.50	66.25	58.0	43.9	50	54.2	50.6	75.2	64.7	81.2
Charmahal	49.8	25.19	56.40	65.96	67.2	44.9	36	52.7	44.3	70.4	55.3	78.8
Fars	43.4	20.69	64.30	67.53	56.2	38.5	51	59.5	56.3	77.4	70.1	85.8
Gilan	33.5	16.33	63.10	69.28	51.1	31.4	38	53.1	58.0	74.6	67.7	85.7
Hamedan	43.4	22.73	56.40	65.56	91.1	46.6	37	53.9	43.6	71.3	47.8	78.8
Hormozgan	49.7	29.93	56.30	65.43	63.9	45.1	40	41.5	41.8	66.6	56.8	73.8
Ilam	50.4	25.68	55.50	63.76	78.7	54.1	41	57.9	40.0	71.2	51.4	77.0
Esfehan	39.4	17.31	60.20	69.06	71.3	32.3	64	80.5	62.7	80.9	70.3	96.1
Kerman	45.4	2413	62.20	65.45	75.9	47.1	43	59.5	51.5	74.8	59.0	81.5
Kermanshah	42.7	22.87	56.50	64.83	74.8	49.4	56	63.6	42.8	70.1	58.8	80.3
Khurasan	44.4	23.62	54.90	64.33	115.2	51.6	48	61.5	46.9	76.8	44.3	80.9
Khuzestan	47.0	27.23	64.90	66.88	71.3	41.1	55	63.7	48.6	70.0	64.3	83.7
Kuhguiluyeh	53.4	29.68	55.90	62.77	83.2	58.0	27	48.1	39.9	68.3	45.6	71.4
Kurdestan	47.6	26.38	53.10	61.58	130.7	63.6	40	56.8	23.2	57.4	28.0	68.4
Lorestan	46.7	25.19	59.10	64.57	76.4	50.6	47	56.1	41.2	68.9	55.6	77.1
Markazi	38.2	19.98	65.30	66.74	105.8	41.7	44	63.5	51.2	73.9	50.7	84.6
Mazandarn	39.0	16.33	62.70	66.71	63.1	42.0	39	49.5	54.4	74.6	62.8	80.3
Ghom	NA.	22.19	NA	67.65	NA	37.8	NA	92.1	57.5	77.0	NA	96.2
Semnan	36.8	18.02	62.90	67.68	63.10	37.5	59	73.8	63.2	80.8	72.2	91.8
Sistan & Bal.	56.0	36.30	51.00	61.11	83.70	65.4	41	48.3	25.3	48.8	43.3	62.1
Tehran	34.5	15.55	68.30	69.30	46.30	31.4	87	85.5	78.4	85.0	93.3	99.4
Yazd	42.5	29.06	59.00	78.54	68.50	37.2	67	80.9	61.60	79.8	71.2	97.3
Zanjan	43.6	23.99	59.60	65.18	105.9	42.8	43	51.3	39.6	67.8	44.6	77.9
Mean	44.0	23.3	59.0	66.1	79.2	45.0	47.8	60.4	47.3	71.3	57.1	81.6
SD	5.6	4.7	4.3	3.3	21.3	8.7	12.4	12.4	12.4	7.9	13.6	9.0

Sources: Figures in columns 1, 3; 2, 4, 8; 5, 6, 9, 10; and 7 extracted respectively from Zanjani (1991: 130 and 176); SCI (2000c); Mehryar (2001); and SCI (1988). Figures in column 11 and 12, and means and standard deviations (SD) were computed by author.

Table 3. Illustration of shifts in social development status of provinces in Iran from 1986 to 1996 by frequency and name of provinces

		Clusters of provinces by Social development status (1996)			Total
		Developed	**Moderate Developed**	**Less Developed**	
Clusters of provinces by Social development status (1986)	**Developed**	Tehran (1)			**1**
	Moderate Developed	Esfehan, Yazd, Semnan (3)	Bushehr, Khuzestan, Mazandarn, Fars, Gilan (5)		**8**
	Less Developed		Kerman, Kermanshah, Charmahal, Lorestan, Khurasan, Zanjan, Ilam, Markazi, Azarbayejan E, Hamedan, Azarbayejan W, Hormozgan (12)	Kuhguiluyeh, Kurdestan, Sistan (3)	**15**
Total		**4**	**17**	**3**	**24**

Source: Figures 4 and 5.

Table 4. Percentage of households by access to certain utilities in urban and rural areas; Iran 1976-1996

Utilities	1976			1986			1996		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
Clean water	52.0	21.5	89.3	74.2	52.1	90.5	87.2	71.1	96.3
Electricity	48.3	14.2	90.2	84.2	66.1	98.1	95.3	88.5	99.1
Telephone	6.7	0.2	13.6	11.1	0.6	18.5	33.1	10.0	46.0

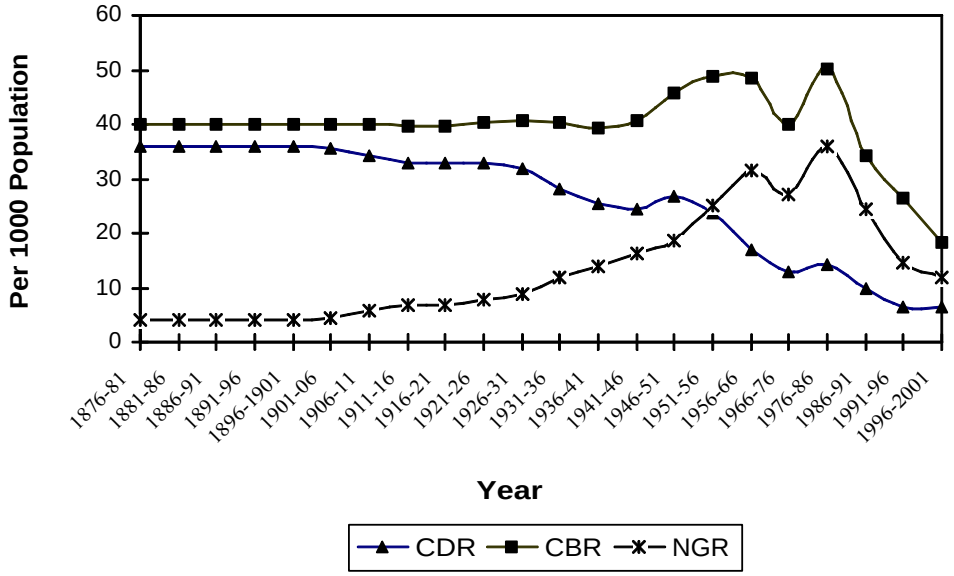
Source: SCI (1999)

Table 5. Literacy rate of population aged 6 and over by urban and rural areas; Iran, 1956-1996

Year	Total Country	Urban Areas	Rural Areas	Difference of Urban and Rural Rates
1956	15.1	34.6	6.1	28.5
1966	29.4	50.4	15.1	35.3
1976	47.5	65.5	30.5	35.0
1986	61.8	73.1	48.0	25.1
1996	79.5	85.7	69.3	16.4

Source: SCI (1999); figures in the last column were computed by author.

Figure 1. Demographic Transition in the Islamic Republic of Iran during 1876- 2001



Source: Table 1

* * * * * H I E R A R C H I C A L C L U S T E R A N A L Y S I S * * * * * *

Dendrogram using Average Linkage (Between Groups)

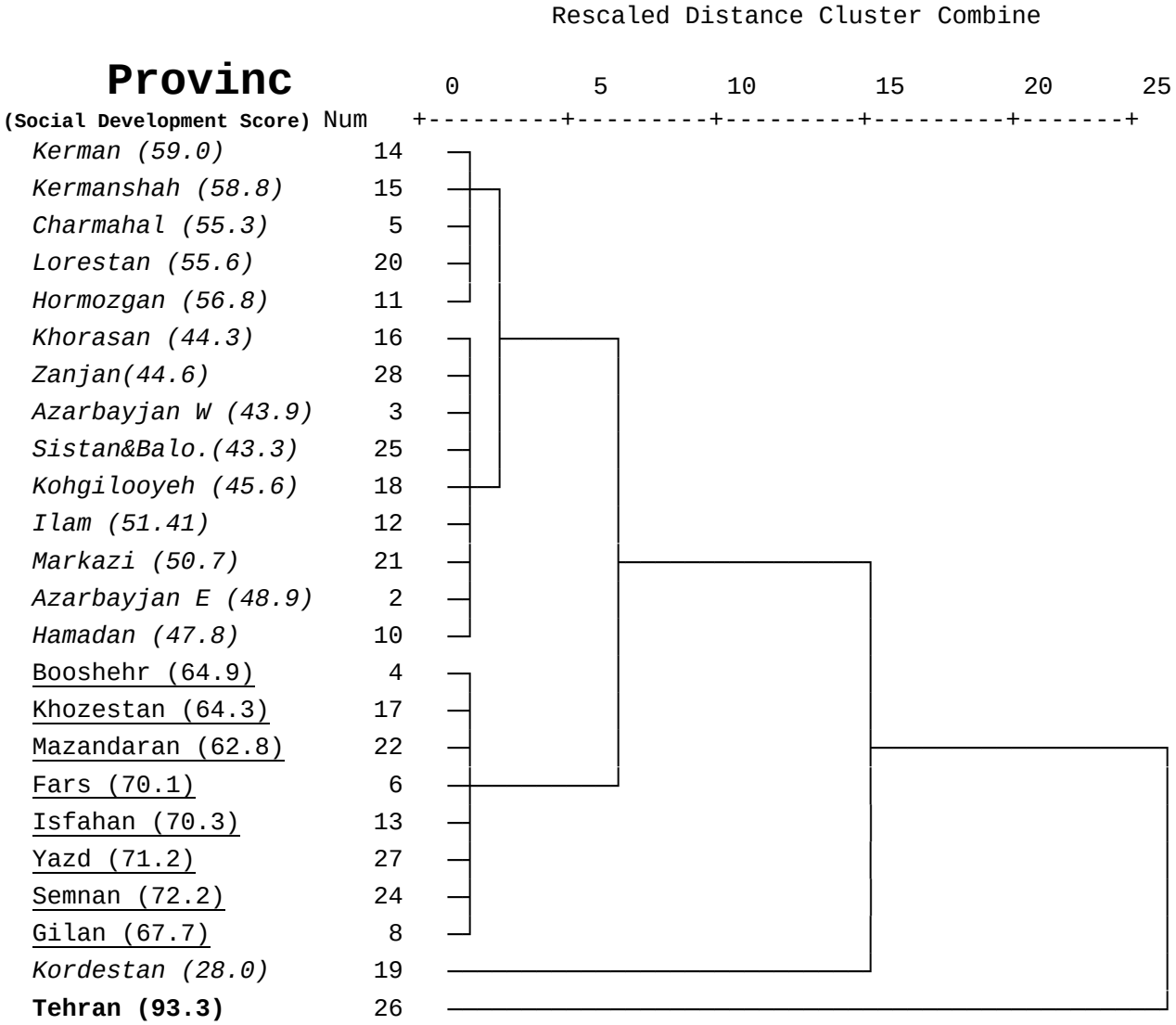


Figure 4. Dendrogram for between-groups linkage hierarchical cluster analysis of scores of social development Index among provinces; Iran, 1986

Legend for Provinces:
Bold: Developed
Underlined: Moderate Developed
Italic: Less Developed

Source: Table 2

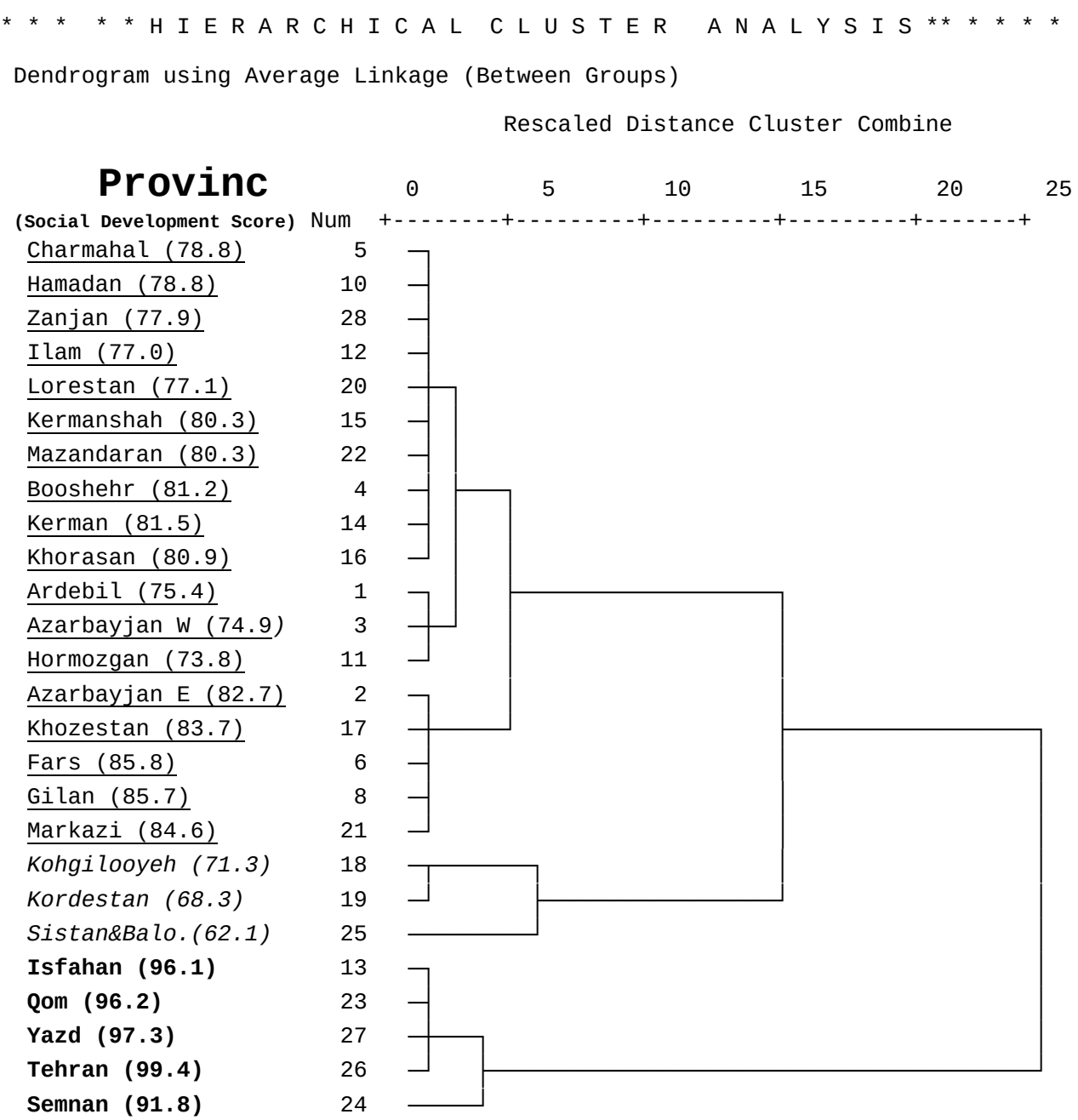
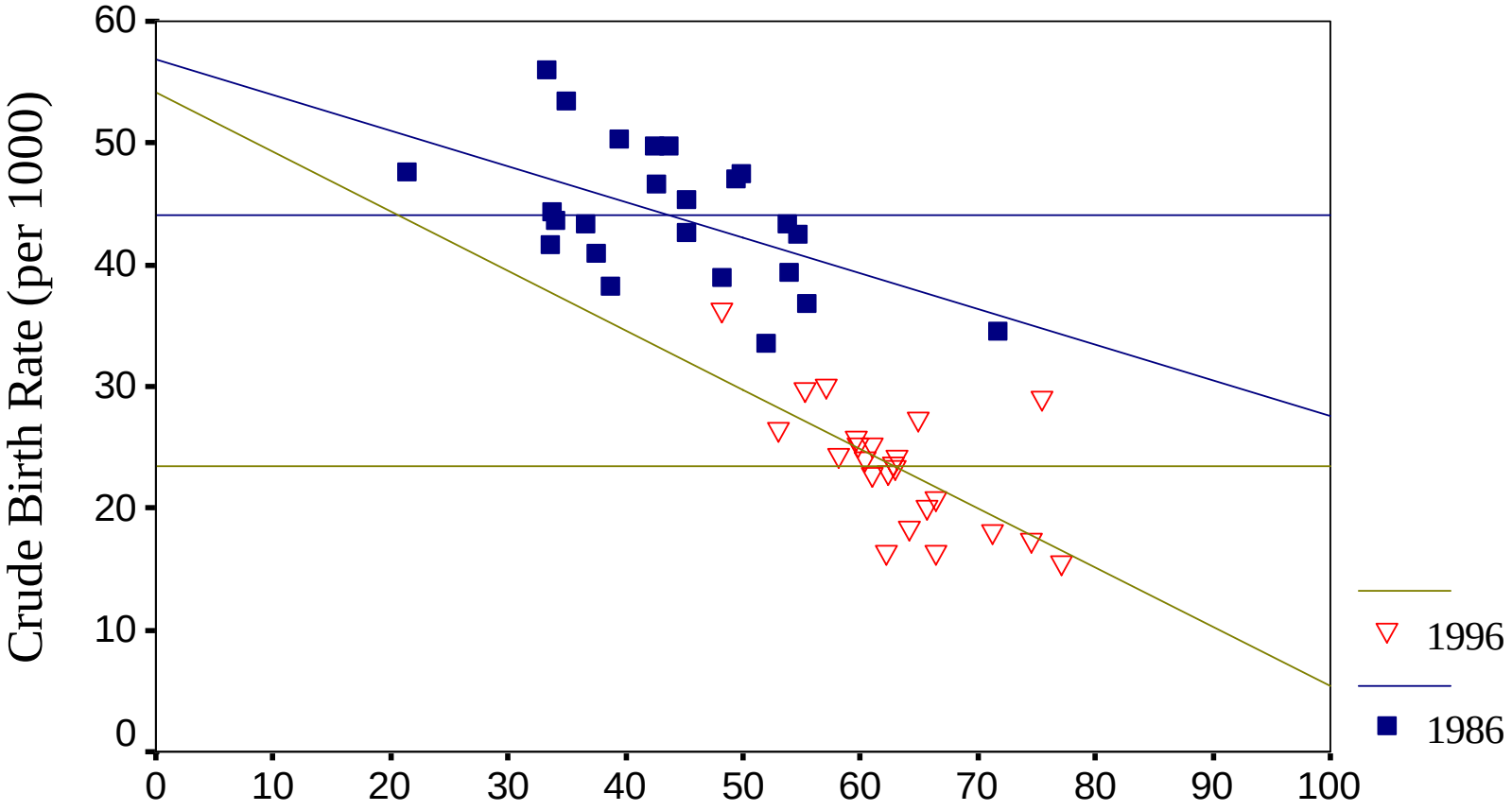


Figure 5. Dendrogram for between-groups linkage hierarchical cluster analysis of scores of social development Index among provinces; Iran, 1996

Legend for Provinces:
Bold: Developed
Underlined: Moderate Developed
Italic: Less Developed

Source: Table 2

Figure 6. Scatter plots of social development and fertility among provinces; Iran,1986 and 1996



Scores of Social Development Index

Source: Table 2