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A QUANTITATIVE STUDY OF SOCIAL AND
POLITICAL DETERMINANTS OF FERTILITY

by Irma Adelman and Cynthia Taft Morris*

I. Introduction

The presence of a significant relationship between fertility rates and socio-political environment is well known; however, precise indications of the magnitudes involved have been lacking. In this paper, an attempt is made to gain some semi-quantitative insights into the influence upon fertility of various types of social and political change. Purely demographic variables have been omitted from the analysis in order to test the relative quantitative importance of selected aspects of the transformation of institutions and values associated with economic development in generating attitudes favorable to family limitation.

For the purpose of this study, the techniques of factor analysis are applied to crude fertility rates and to a large number of indices representing the social and political structure of 55 less-developed countries in the period 1957-1962. A systematic relationship is derived between crude

* The authors are respectively Associate Professor of Political Economy at Johns Hopkins University and Associate Professor in Research (Department of Economics) at American University. At the time of this study, they were both consultants to the Office of Program Coordination of the Agency for International Development. We are grateful to H.B. Chenery for making this study possible. We are also indebted to David Cole, Clarence Gulick, Joan Nelson and Alan Strout for helpful comments and suggestions at various stages of this investigation. A large number of regional and country experts at the Agency for International Development and the Department of State were extremely helpful in the classification of individual countries with respect to the various social and political indicators included in the study. Final responsibility for both the country classifications and the results of the study rests of course with the authors.

fertility and 4 latent factors, each of which depicts an important aspect of social environment or political organization. The results of the analysis provide quantitative evidence in support of certain hypotheses concerning the basic forces which have been responsible for the historical decline in fertility experienced in Western Europe during the latter part of the 19th and the early 20th centuries. These hypotheses imply certain policy recommendations concerning measures which may be adopted in currently less-developed areas to stimulate fertility decline.

II. The Technique of Analysis

The technique used in this paper, factor analysis,* was developed primarily by psychologists in connection with the determination of mental factors from scores on various psychological tests. The primary purpose of factor analysis is to reduce the original number of explanatory variables into a smaller number of independent factors in terms of which the whole set of variables may be understood. Factor analysis thus provides us with a simpler, more compact, explanation of the regularities apparent in the empirical results.

As in regression analysis, factor analysis decomposes the original variance of a variable into variance components associated with the variation of a set of other quantities. In regression analysis, the variable whose variation is decomposed in this manner is known as the dependent variable and

* For a detailed treatment of the technique of factor analysis, see H. H. Harman, Modern Factor Analysis (University of Chicago Press, 1960) and L. L. Thurstone, Multiple Factor Analysis (University of Chicago Press, 1961).

the variables which account for various portions of its variation are the independent variables. In factor analysis, each of the variables included in the study is treated as dependent and as independent in turn. Thus, by contrast with regression analysis, which is a study of dependence, factor analysis is a study of mutual interdependence.*

Another point which distinguishes factor analysis from regression analysis is that in factor analysis the final explanatory variables are not observable magnitudes. They are, rather, groupings of the original variables into a number of clusters, known as "factors." Each cluster consists of a linear combination of the initial variables included in the study. The principles by which each cluster, or "factor", is formed from the observable variables are the following:

- (1) Those variables which are most closely inter-correlated are combined within a single factor.
- (2) The variables allocated to a given factor are those which are most nearly independent of those allocated to the other factors.
- (3) The factors are derived in a manner which maximizes the percentage of the total variance attributable to each successive factor (given the inclusion of the preceding factors).
- (4) The factors are independent uncorrelated with each other.**

* This point is made by M. G. Kendall, "Factor Analysis as a Statistical Technique", Journal of the Royal Statistical Society (Series B), p. 61.

** One can also drop this last restriction, but its inclusion is obviously preferable, a priori.

To state the method more specifically, let x_i be the i th variable and x_{ij} be the value assumed by the i th variable on the j th observation. In our study, the variables are the social and political indicators; the observations are the various underdeveloped countries included in our sample. A particular x_{ij} thus represents the score assigned to the j th country on the i th social or political characteristic.

As pointed out above, it is the purpose of factor analysis to represent each variable ($i = 1, \dots, n$) x_i as a linear combination of several underlying factors. Two types of factors are distinguished: common factors are those which are required to explain the intercorrelations among the variables; unique factors account for that portion of the variation of a variable which cannot be attributed to the correlation of the variable with other variables in the sets. If we denote the c^{th} common factors by F_c , and the n unique factors by U_i the basic postulate of factor analysis is that

(1) $x_i = a_{i1} F_1 + \dots + a_{im} F_m + b_{i1} U_1 + c_{i1} E_1$ where E_1 is a random error term. In other words, it is assumed that each variable x_i can be expressed as a linear composite of the m common factors, a unique factor, and a random error.

Factor analysis can therefore be interpreted as a regression of the observed x_i on the unobserved common factors F_c and on a specific factor.

A major aim of factor analysis is to determine the coefficients a_{i1}, \dots, a_{im} of the common factors.* These coefficients, which are referred

* The contribution of the unique factor can be evaluated as a residual.

to as factor loadings, play the same rôle in factor analysis as do regression coefficients in correlation analysis. Since the squared factor loadings represent the relative contribution of each factor to the total standardized variance of a variable,** the sum for each variable of its squared factor loadings (known as the "communality") indicates the extent to which the common factors account for the total unit variance of the variable. Thus, the rôle of the communality in factor analysis is analogous to the rôle of the coefficient of multiple determination, R^2 , in regression analysis.

The merit of factor analysis lies in its power to simplify statistical data arising from complex and comparatively unexplored areas of scientific endeavor. In the more advanced fields of scientific inquiry, the task of simplification is carried out in two steps. First, a theoretical statistical model which the data may be presumed to obey is formulated. The data are then analyzed in the light of the model and checked against it. However, the theory of the dynamics of the determination of fertility is not sufficiently well specified to permit the formulation of reasonable a priori models against which to test the empirical results. Under such circumstances, it becomes desirable to leave the specification very general and to try to use the data as a guide in the formulation of hypotheses concerning the relative importance of different sources of variation. It is this latter approach which underlies the use of factor analysis. As pointed out by Thurstone,***

** See Appendix B.

*** L.L. Thurstone, Multiple Factor Analysis (University of Chicago Press, 1961) P. 56.

who pioneered the use of factor analysis in psychology, "Factor analysis has its principal usefulness at the border line of science. It is naturally superseded by rational formulations in terms of the science involved. Factor analysis is useful, especially in those domains where basic and fruitful concepts are essentially lacking and where crucial experiments have been difficult to conceive. The new methods have a humble role. They enable us to make only the rudest first map of a new domain. But if we have scientific intuition and sufficient ingenuity, the rough factorial map of a new domain will enable us to proceed beyond the exploratory factorial stage to the more direct forms of psychological experimentation in the laboratory."

III. Choice of Social and Political Variables

Since factor analysis can use as data inputs a relatively large number of intercorrelated variables, a broad selection of indicators of the social and political structure of 55 less-developed countries during the period 1957-1962 was included in our study of fertility patterns.

The social characteristics included were selected to depict the social changes associated with urbanization and industrialization. The transformation of social structure was represented by the character of basic social organization, the size of traditional subsistence sector and the strength of traditionally-oriented elite. Several characteristics were chosen to describe the

modernization of communication, education and outlook: the extent of literacy, the extent of mass communication, the extent of ethnic (in particular, linguistic) homogeneity and lastly, the degree of modernization. Other social aspects of industrialization are represented by the strength of indigenous middle class, the strength of labor movement, the extent of social mobility and the degree of social tension.

The choice of political indicators for our study was designed to summarize leading aspects of the growth of modern nation states. Those chosen to characterize differences in the nature and stability of political systems were: the strength of democratic institutions, the predominant basis of political parties, the extent of factionalization of political parties, the degree of freedom of political opposition and press, the extent of centralization of political power and the extent of political stability.

The quality and orientation of political administration and leadership are represented by several characteristics: the degree of administrative efficiency, the extent of leadership commitment to economic development, the intensity of nationalism and the extent of government participation in economic activity.

Three characteristics depict the importance of key interest groups within a nation: the strength of the labor movement and the strength of the traditionally-oriented elite already mentioned, and the political strength of the military.

A final characteristic included in the study is the classification of countries by type of religion.

We were obliged at an early stage in classifying countries to reject several indicators which we found could not be formulated with sufficient concreteness to permit unambiguous country classifications. The importance of achievement motivation and social attitudes toward economic activity were indicators which appeared desirable a priori but which we were obliged to reject on this score.

The complete list of the social and political characteristics included in the final version of the factor analysis is as follows:

1. Crude Fertility Rate
2. Size of Traditional Agricultural Sector
3. Basic Character of Social Organization
4. Extent of Literacy
5. Extent of Mass Communication
6. Degree of Cultural and Ethnic Homogeneity
7. Significance of Indigenous Middle Class
8. Degree of Modernization of Outlook
9. Type of Religion
10. Effectiveness of Democratic Institutions
11. Degree of Freedom of Political Opposition and Press
12. Degree of Factionalization of Political Parties
13. Basis of Political Party System
14. Strength of Labor Movement
15. Political Strength of the Military

16. Degree of Administrative Efficiency
17. Degree of Centralization of Political Power
18. Extent of Social Mobility
19. Strength of Traditional Elite
20. Extent of Nationalism and Sense of National Unity
21. Degree of Commitment of Leadership to Promoting Economic Development
22. Extent of Government Participation in Economic Activity
23. Degree of Social Tension
24. Extent of Stability of Political System

Two characteristics included in preliminary analyses were eliminated, since they neither added materially to an understanding of crude fertility rates nor related to other social and political aspects studied. These were recency of independence and length of colonial experience.

IV. Definition of Variables and Method of Classification

A description of the classification scheme for each socio-political indicator incorporated in the study is presented in detail in Appendix A, together with a list of the countries included in the sample. The discussion in this section will be merely illustrative.

The procedures used in defining indicators and in ranking countries differed somewhat for various types of country characteristics. Three different types were distinguished: (1) those for which classification could be based solely on published statistics;

(2) those for which it was necessary to combine statistical and qualitative elements; and (3) those which were purely qualitative in nature.

With respect to indicators defined by published statistics classification of countries was relatively simple. Four to six brackets were established into which countries were grouped. Where data permitted, gradations within categories were also differentiated. The classification schemes for the extent of literacy and for crude fertility rates (the details of which are in Appendix A) illustrate the methods used for this type of variable.

Sometimes more than one statistical series was used to describe a characteristic. For example, the variable describing the extent of mass communication is based upon a composite index of newspapers in circulation and radios in use. The principal categories were set in terms of newspapers in circulation and gradations within brackets based on radios in use or licensed. * Where the decile into which a country fell with respect to the newspaper index was 2 or more deciles removed from that in which it fell with respect to the radio index, classification was determined by a rough average of the two. To illustrate, the classification scheme for the B category of the extent of mass communication is as follows:**

<u>Classification</u>	<u>Case Deciles of Newspaper Circulation</u>	<u>Case Deciles of Radios Licensed or in Use</u>
B/	V	III or IV or V
B	V	VI

* These Data are published in Russett et al., Handbook of Basic Political and Social Data.

** See Appendix A for further details.

B-
B-

VI
VII

V or VI or VII
V

The most complex of the characteristics described by composite statistical information is the degree of cultural homogeneity for which the principal categories are defined in terms of linguistic homogeneity and gradations within them determined by degree of racial and religious homogeneity.

A second type of country characteristic is distinguished by a blend of important judgmental elements with statistical elements. The derivation of the variable describing the extent of social mobility illustrates the procedures employed for this type of characteristic. Since social mobility proved too broad a concept to be described by published statistics alone, two qualitative aspects of mobility, access to leadership elite and extent of ethnic barriers to advancement, were combined in this variable with a statistical measure of educational opportunity.

Four principal categories of social mobility were distinguished in the following manner. The fourth category was defined to include all countries with prohibitive racial or cultural barriers affecting important segments of the population; countries were assigned to this class on the basis of published country studies. Next, the third interval was distinguished on the basis of the extent of educational opportunity; this class comprised all countries not having prohibitive social barriers to mobility in which less than 25% of school-age children (5-19) were in school, since de facto social mobility is of necessity low where very few people have access to education.* Finally, the

* We used adjusted data on primary and secondary pupils published in Russett et al., Handbook of Basic Political and Social Data for all countries but a few for which country experts considered that the published data was grossly in error.

remaining countries with over 25% of school-age children (5-19) in school were distributed between the first and second categories according to access to membership in leadership elites.**

A third and important type of country characteristic included in our study was the purely judgmental one. Even for qualitative indicators, it proved possible to arrive at category descriptions which were sufficiently precise and inclusive to permit unambiguous classification of most countries. Cross-checks to preliminary classifications were obtained by consulting A.T.D. and other country experts and by referring to published country and regional studies.

The classification of countries according to extent of nationalism and sense of national unity illustrates the procedures followed with purely judgmental indicators. Three categories of countries were distinguished:

A. Countries characterized by intense nationalism and strong senses of national unity; B. Countries having moderate degrees of nationalism and moderate senses of national unity; and C. Countries in which there was little evidence of nationalism or national unity. A Statement of category descriptions together

** The principal source of judgmental information used for this purpose was Banks and Textor, A Cross-Polity Survey. The Banks and Textor raw characteristic deck became available prior to the publication of A Cross-Polity Survey, when the classification of countries on the basis of published sources was underway. The Survey provided basic information for five characteristics (the extent of ethnic homogeneity, the extent of social mobility, the basis of political parties the factionalization of political parties and type of religion) and valuable cross-checks for eleven other characteristics (the degree of modernization, the degree of social tension, the degree of leadership commitment to development, the extent of political stability, the degree of centralization, the strength of democratic institutions, the degree of freedom of opposition and press, the date of independence, the strength of traditional elites, and the political strength of the military).

with preliminary country classifications was circulated to some 30 A.I.D. regional experts with a request for corrections and suggestions.* It appeared from their comments that the proposed scheme did not distinguish sufficiently between the intensity of nationalism of the leaders and overall sense of national unity. The final formulation therefore differentiated between two categories of intense nationalism, one for countries with intense nationalism and strong sense of national unity and another for those with intense nationalism and only moderate or limited sense of national unity.**

Once the classification of countries according to the various characteristics was complete, each of 55 less-developed countries had been given a letter score, A, A-, B ~~/~~, B, etc. with respect to 24 social and political indicators.

Since the use of factor analysis requires that the variables be specified numerically, the final task in preparing data inputs was the

* Our use of the suggestions of regional experts may require some comment. Where more than one expert made corrections of an individual country classification which were consistent with respect to direction and degree, these were accepted without further study. Where corrections were consistent with respect to direction but differed somewhat in degree, a rough average of the corrections was made. Where corrections showed marked inconsistency and differences, an attempt was made to reformulate the categories in an effort to obtain more consistent classification of individual countries.

** See Appendix A for detailed descriptions of these categories.

assignment of scores to the letter classifications. The scale chosen was a simple linear one.* It is obvious, of course, that the choice of numerical scale for qualitative indicators is arbitrary. However, the use of an arbitrary scale does not appear seriously to invalidate the results. For inasmuch as the raw material of factor analysis consists of the correlation matrix among the various social and

* The linear scale used ranged from 1 to 100, assigning a score of 90 to the highest letter classification, A, and a score of 10 to the lowest letter classification of each characteristic C, D, E, or F. We then scored the intermediate letters at equidistant intervals between 10 and 90. Plus and minus classifications were not scored at equidistant intervals, but were scored in such a manner that the distance between the plus and minus of different adjacent categories was approximately double the difference between any given letter classification and its plus or minus. This procedure may be illustrated by the following scoring scheme for classifications ranging from A to C, and those ranging from A to D:

<u>Letter Classification</u>	<u>Numerical Score</u>	<u>Letter Classification</u>	<u>Numerical Score</u>
A /	100	A /	97
A	90	A	90
A-	80	A-	83
B /	60	B /	67
B	50	B	60
B-	40	B-	54
C /	20	C /	41
C	10	C	35
C-	1	C-	29
		D /	16
		D	10
		D-	4

and political characteristics** and correlation coefficients are unaffected by linear changes in scale, the results are invariant with respect to linear transformations of the scale used.

Several nonlinear changes in scale were tried also tried (such as a log transformation and the use of reciprocal), but it was found that the results of these transformations either yielded similar results or made less sense and varied more with changes in sample size than the simple linear scale chosen.**

V. The Factor Analysis: Results and Interpretation

The results of the Factor Analysis are summarized in the matrix of common factor coefficients presented in Table I. Each entry a_{ij} of the matrix shows the importance of the influence of factor j upon socio-political indicator i . More specifically, the entries indicate the net correlation between each factor and the observed variables. These are referred to as "factor loadings".

** See Appendix B.

TABLE 1

Rotated Factor Matrix for
24 Social and Political Variables*

-16-

Social and Political Indicators	Rotated Factor Loadings				h_1^2 (R^2)
	F ₁	F ₂	F ₃	F ₄	
1. Crude Fertility Rate	-.50	-.33	-.04	.12	.377
2. Size of Traditional Agricultural Sector	-.82	-.27	-.20	-.04	.793
3. Basic Character of Social Organization	.84	.16	.05	.01	.738
4. Extent of Literacy	.86	.27	.06	-.10	.824
5. Extent of Mass Communication	.88	.28	.07	.01	.861
6. Degree of Cultural and Ethnic Homogeneity	.78	-.32	.01	-.14	.733
7. Significance of Indigenous Middle Class	.62	.34	.39	-.08	.654
8. Degree of Modernization of Outlook	.64	.49	.28	-.11	.735
9. Type of Religion	.77	.21	-.17	-.01	.661
10. Effectiveness of Democratic Institutions	.41	.79	.10	-.23	.858
11. Degree of Freedom of Political Opposition and Press	.31	.83	-.15	-.07	.819
12. Degree of Factionalization of Political Parties	.38	.68	-.19	.39	.798
13. Basis of Political Party System	.51	.58	.09	.20	.645
14. Strength of Labor Movement	.30	.69	.31	.02	.664
15. Political Strength of the Military	.36	-.62	-.29	.32	.709
16. Degree of Administrative Efficiency	.27	.62	.33	-.29	.646
17. Degree of Centralization of Political Power	-.06	-.84	-.23	.01	.764
18. Extent of Social Mobility	.40	.11	.57	-.25	.558
19. Strength of Traditional Elite	.12	-.25	-.78	.16	.713
20. Extent of Nationalism and Sense of National Unity	.62	-.07	.62	.07	.778
21. Degree of Leadership Commitment to Economic Development	-.03	.28	.69	-.30	.647
22. Extent of Government Participation in Economic Activity	.21	-.38	.59	.46	.756
23. Degree of Social Tension	-.17	.05	-.06	.87	.800
24. Extent of Stability of Political System	.06	.16	.34	-.82	.810

*Boxes indicate the factor to which each variable is assigned.

The interpretation of factor loadings may more easily be made in terms of the squares of the entries in the factor matrix. Each $(a_{ij})^2$ represents the proportion of the total unit variance of variable i which is explained by factor j, after allowing for the contributions of the other factors. If the first row of the table is examined, it can be seen that 25% of inter-country variations in crude fertility are explained by Factor I, an additional 11% by Factor II, and another 1.4% by Factor IV; the net contribution of Factor III is negligible.

The right hand column of the table gives the sum of the squared factor loadings, or the "communality" of each variable. It will be recalled that the communality indicates the proportion of the total unit variance explained by all the common factors taken together. The communality of crude fertility rates, for example, is:

$$(-.50)^2 + (-.33)^2 + (-.04)^2 + (.12)^2 = .377$$

That is to say, 38% of inter-country variations in crude fertility are explained by the four common factors which are extracted from the 24 socio-political variables incorporated in our analysis. This result is not inconsistent with values of R^2 obtained from previous cross-country regression studies relating age-specific birth rates to economic and social variables.*

* See I. Adelman, "An Econometric Analysis of Population Growth," American Economic Review, LIII (June 1963), pp. 314-339.

The matrix of factor loadings, in addition to indicating the weight of each factor in explaining the observed variables, provides the basis for grouping the variables into common factors. Each variable may reasonably be assigned to that factor with which it shows the closest linear relationship, i.e. that factor in which it has the highest loading. Table I lists first, indicators which have their highest loading in Factor I, then those with highest loadings in Factor II, III and IV successively. The highest loading for each indicator is boxed.

Once variables are assigned to common factors, the factors need to be "identified" by giving a reasonable explanation of the underlying forces which they may be interpreted to represent. To quote Thurstone.*

"The derived variables are of scientific interest only insofar as they represent processes and parameters that involve the fundamental concepts of the science involved."

We shall, therefore proceed to identify the factors which are specified in the results of our statistical analysis.

The First Factor

The characteristics having their highest loadings in Factor I are: the size of traditional sector, the character of basic social organization, the extent of literacy, the extent of mass communication, the degree of cultural homogeneity, the significance of indigenous middle class, the degree

* Multiple Factor Analysis, p. 61.

of modernization and the type of religion. Thus, this factor obviously portrays the social and cultural changes accompanying urbanization and industrialization.

More specifically, Factor I may be interpreted to represent the processes of change in attitudes and institutions associated with the breakdown of traditional social organization. Social change may be viewed as taking place through the mechanism of differentiation and of integration of social structure.* Differentiation involves "the establishment of more specialized and autonomous social units;"** integration is the process which coordinates and fuses the interactions of specialized social entities.

Three variables with high loadings in this factor depict the process of social differentiation: the basic character of social organization groups countries according to the degree of differentiation of nuclear family (the parent-children unit) from extended kinship, village and tribal complexes; the size of traditional sector measures the extent to which self-sufficient family-community economic units have broken up. The strength of indigenous middle class indicates the importance of a specialized group whose economic activities are removed from traditional socio-economic contexts.

* See Neil Smelzer, "Mechanisms of Change and Adjustment to Change," in B.F. Hoselitz and W.E. Moore, Eds., Industrialization and Society (UNESCO, 1963), pp. 32 ff.

** Ibid, p. 33.

The process of social integration is also portrayed by several variables. Improvements in mass communication media, increases in literacy and the growth of linguistic homogeneity may all be viewed as part of the evolution of modern mechanisms which tend to weld together relatively diversified social units.*

The two final variables composing Factor I, degree of modernization and type of religion, represent fundamental changes in social attitudes which typically accompany urbanization and industrialization. The degree of modernization of outlook is an overall indicator of the extent to which attachments to traditionalism and traditional society have lost their strength. The indicator of type of religion, since it groups countries according to the degree to which the predominant religion promotes belief in man's capacity to alter his environment, is a broad measure of the extent of decline in importance of traditional religious philosophies.

The direction of the relation between crude fertility and the socio-cultural characteristics grouped in Factor I is indicated by the signs of their loadings in this factor. Seven of the eight characteristics show negative associations with crude fertility; only size of traditional sector has the same sign as does crude fertility. This association of high fertility

*Emil Durkheim has pointed out with special emphasis that the increasing division of labor and growing social heterogeneity which accompany industrialization require the creation of new mechanisms for integrating societies. The Division of Labor in Society (Glencoe, Ill., 1949), Ibid., p. 41.

rates with large subsistence sectors is what one would expect, since rural populations are generally more fertile than urban populations and since subsistence rural sectors are more likely than commercial agriculture to be dominated by social systems in which high fertility rates are common.

The opposite signs of the loadings in Factor I of fertility and character of basic social organization, are a further indication that the more traditional kinship forms -- the tribe, the clan, and the extended family -- tend to be found in countries with high fertility rates.

The positive loading of the extent of literacy in Factor I reflects the well-known inverse relation between level of education and fertility, while the plus sign for extent of mass communication is consistent with the familiar finding that modern urbanized industrialized nations tend to have both extensive mass communication media and low fertility rates.

Since the main criterion for scoring countries with respect to their degree of cultural homogeneity was the proportion of population speaking the predominant language, the association of greater cultural homogeneity with lower fertility apparent in Factor I reflects the impact of urbanization in improving communication among members of the population.

The strength of the indigenous middle class is another indicator associated with Factor I which varies inversely with the rate of fertility. This result was to be anticipated, in view of the key role of the middle classes in furthering the processes of industrialization.

It was also to be expected that fertility would be lower in countries in which modernization - social, economic and political - receives

widespread support from both urban and rural groups; this is evident from the opposite signs in Factor I of fertility and the degree of modernization.

Finally, the negative relation between crude fertility rates and type of religion found in Factor I accords with what one would expect, inasmuch as religions have been ranked according to the degree to which they promote belief in the individual's control over his personal fate. Countries having religions which encourage belief in man's ability to control his environment tend to have lower birth rates than those characterized by a strong degree of religious fatalism.

The Second Factor

The socio-political indicators with their highest loadings in Factor II are the strength of democratic institutions, the freedom of political opposition, the degree of factionalization of political parties, the basis of political party system, the strength of labor movement, the political strength of the military, the degree of administrative efficiency, and the degree of centralization of political power. These are all indicators which describe variations among countries in political systems.

In particular, the pattern of associations incorporated in Factor II is strongly suggestive of broad historical and contemporary differences between the political organization of the countries of Western Europe and the North Atlantic and those of the rest of the world. An increase in this factor may be interpreted to represent a movement along a scale which ranges from centralized authoritarian political forms to Western-type parliamentary systems. Such an interpretation is consistent with the particular juxtaposition of characteristics subsumed in the factor. Thus, a positive change in Factor II is composed of (1) increases in the effectiveness of democratic institutions,

the freedom of political opposition, the factionalization of political parties, the strength of labor movements and the efficiency of public administration; (2) a movement from political parties emphasizing considerations of national unity toward those stressing ideological platforms; and (3) decreases in the strength of the military and in the extent of centralization. Historically, it is in Western Europe that a pattern of change occurred in which effective parliamentary institutions were associated with strong labor movements, weak political strength of the military and decentralization of political power. This factor, therefore, may be interpreted to represent the extent of political westernization.

The coefficients resulting from the factor analysis indicate that a typically western configuration of political traits is generally associated with lower fertility. Thus, the variable representing the basis of party system shows that there exists a tendency for low-fertility nations to have ideologically-based or personalistic multi-party systems rather than mass-directed one-party systems. By the same token, countries with low birth rates also tend to have well established labor movements and politically weak military groups. Finally, higher degrees of administrative efficiency and greater decentralization of political power often accompany lower fertility.

The presence of a systematic association between political systems and birth rates is somewhat surprising. The explanation for this apparent effect of political structure upon fertility may be that the existence of well-developed Western political institutions is a good indicator of the degree to which acceptance by individuals of the breakdown of ascriptive traditional patterns has permeated the society. As pointed out by Daniel Lerner,*

* The Passing of Traditional Society (The Free Press of Glencoe, 1958), p. 64.

"Democratic government comes late, historically, and typically appears as a crowning institution of the participant society . . . This capacity to incorporate continuing social change within the existing framework of institutions has become a distinctive structural feature of the developed modern societies."

In other words, to sustain the legal and political forms characteristic of western polities requires a transformation, not only in political organization and institutions, but also in the living habits, beliefs and emotions of the individual members of society. It is this transformation of basic attitudes which probably accounts for the association of complex political systems with lower fertility.

The Third Factor

Factor III (which accounts for a negligible proportion of total unit variance) is based upon five socio-political characteristics: strength of traditional elite, extent of nationalism, degree of leadership commitment to development, extent of government participation in economic activity, and extent of social mobility.* The character of leadership and the nature of leadership strategies provide the common bond for these indicators.

At one end of the scale are leaders motivated by strong attachment to the preservation of traditional society. Access to these traditional leadership groups is limited to particular social, cultural or ethnic strata of the population. At the other end of the scale are intensely nationalistic leaderships committed to industrialization and to state direction of economic development. A movement

*The reason for the high loading of the indicator of extent of social mobility in the factor which groups together leadership characteristics is that an important element in the definition of this indicator is the degree of openness of access to membership in the leadership elite.

along the scale thus implies a decline in the power of traditional elites and a rise in the strength of nationalistic "industrializing elites."**

The signs of the loadings in Factor III indicate some tendency for lower fertility to exist in countries characterized by nationalistic industrializing elites. This result is consistent with the fact that a weakening of the power of traditional leaderships is often accompanied by a generalized decrease in the influence of traditional attitudes throughout the society.*** As pointed out earlier, however, the net explanatory value of the leadership characteristics grouped in this factor is somewhat small.

The Fourth Factor

An examination of Factor IV shows an inverse relation between fertility rates and social and political stability. This finding indicates that the absence of serious social tensions and of grave political instability is conducive to somewhat lower reproduction rates. A possible explanation of this result is that parents generally aim for a certain number of surviving children. Under these circumstances an increase in tension and instability would tend to lead to greater fertility to offset the implied threat of higher mortality. This effect is similar to the one adduced by demographers to explain why a higher infant mortality rate is generally associated with increased fertility. The quantitatively small impact of this factor suggests, however, that the forces which it represents are of rather marginal significance to an explanation of fertility rates.

** The concept of an industrializing elite is discussed in Clark Kerr et al., Industrialism and Industrial Man (Oxford University Press, 1964), Chap. 2.

*** For a discussion of the effect of traditional attitudes upon fertility, see the references in United Nations. Determinants and Consequences of Population Trends (1953), p. 77, footnote 66.

The Impact Upon Birth Rates of Per Capita GNP

Table 2 presents the rotated factor matrix for per capita GNP together with 24 social and political variables. It is striking that the inclusion of GNP per head in the factor analysis neither adds to the total explanation of fertility patterns nor changes significantly the individual factor coefficients. As would be expected, per capita income is most strongly related to Factor I which depicts the social and cultural changes accompanying industrialization. It appears, however, that the influence of GNP upon birth rates is substantially accounted for by the socio-cultural concomitants of economic growth represented in Factor I. The net effect upon fertility of the addition of a direct economic measure of economic development, therefore, seems to be negligible.

VI. Conclusions and Speculations

In this paper, some quantitative insights were obtained into the nature of the relationship between crude birth rates and two aspects of social and political change commonly associated with economic development: the socio-cultural concomitants of the industrialization-urbanization process (Factor I), and the westernization of political institutions (Factor II). The results of the factor analysis indicate that approximately 25 percent of intercountry variations in fertility are associated with differences in the degree of specialization and integration of social structure. As might be expected, there is a systematic tendency for birth rates to decline with those social changes which characteristically accompany industrialization.

TABLE 2

Rotated Factor Matrix for
24 Social and Political Variables and Per Capita GNP*

Social and Political Indicators	Rotated Factor Loadings				h_i^2 (R^2)
	F ₁	F ₂	F ₃	F ₄	
1. Crude Fertility Rate	-.52	.30	.03	-.11	.371
2. Size of Traditional Agricultural Sector	-.85	.23	.20	.04	.822
3. Basic Character of Social Organization	.84	-.12	-.05	-.01	.728
4. Extent of Literacy	.87	-.22	-.06	.10	.818
5. Extent of Mass Communication	.90	-.23	-.08	-.01	.864
6. Degree of Cultural and Ethnic Homogeneity	.76	.37	-.01	.15	.740
7. Significance of Indigenous Middle Class	.63	-.32	-.38	.08	.650
8. Degree of Modernization of Outlook	.66	-.46	-.26	.11	.735
9. Type of Religion	.79	-.17	.16	-.00	.674
10. Effectiveness of Democratic Institutions	.45	-.78	.08	.21	.866
11. Degree of Freedom of Political Opposition and Press	.36	-.81	.17	.05	.818
12. Degree of Factionalization of Political Parties	.42	-.64	.20	-.41	.792
13. Basis of Political Party System	.53	-.52**	-.07	-.22	.603
14. Strength of Labor Movement	.35	-.67	-.29	-.03	.662
15. Political Strength of the Military	.34	.67	.27	-.32	.747
16. Degree of Administrative Efficiency	.32	-.61	-.30	.27	.635
17. Degree of Centralization of Political Power	-.11	.84	.21	.00	.762
18. Extent of Social Mobility	.41	-.11	-.56	.26	.562
19. Strength of Traditional Elite	.10	.28	.77	-.17	.715
20. Extent of Nationalism and Sense of National Unity	.60	.10	-.62	-.06	.767
21. Degree of Leadership Commitment to Economic Development	.01	-.31	-.68	.30	.648
22. Extent of Government Participation in Economic Activity	.17	.39	-.62	-.43	.745
23. Degree of Social Tension	-.17	-.05	.04	-.87	.797
24. Extent of Stability of Political System	.07	-.18	-.31	.82	.810
25. Per Capita GNP	.67	-.41	-.21	.06	.666

*Boxes indicate the factor to which each variable is assigned.

**Since the indicator of basis of political party system has nearly the same loading in Factors I and III, it is assigned to that factor to which it is judged to have the closest affinity.

Differences in the strength of political westernization (Factor II) account for an additional 11 percent of cross-country variations in birth rates. In general, countries characterized by lower natality tend to be those in which political systems of the Western type are more highly evolved. On the other hand, the inclusion of a broad measure of economic structure in the analysis does not add significantly to the explanation of fertility.

One possible interpretation of these weak but statistically significant correlations is to ascribe them to a common component implicit in both the process of social modernization and that of political westernization. It is therefore tempting to speculate as to the nature of the basic changes in individual outlook, conducive to family limitation, which underly the social and political transformations represented in Factors I and III.* It appears to us that a single fundamental change in mentality is implicit in both dynamic processes. This change is the development of the spirit of rationalist individualism. With respect to the first factor, the spread of thought patterns which encourage the application of individual rationality to everyday decisions seems to be both a pre-requisite and a concomitant of the socio-cultural and technological revolution associated with industrialization and urbanization.** With respect to the second

* Points of view which relate differences in fertility patterns to the character of the overall civilization are developed in P. Aries, Histoire des Populations Francaises et de leurs Attitudes devant la Vie depuis le XVIIIe Siecle (Paris, 1948), pp. 545 ff. These are, of course, common also to most anthropological studies.

** For a discussion of this point, see, for example, J.A. Schumpeter, Capitalism, Socialism and Democracy, 3rd ed. (Harper, 1950), Chap. 9.

factor, the political institutions which evolved in the West are founded on voluntary participation by individuals expressing personal preferences in the political arena.*** Political westernization thus implies a widening of the sphere of life in which alternative courses of action are compared and weighed against one another. Once habits of rationalistic individual choice in matters relating to economic, social and political activity are firmly rooted, rational attitudes tend also to influence decisions affecting family size.****

To the extent that these speculations are valid, they suggest the desirability of orienting educational systems in high natality countries away from traditional, classical education towards education which emphasizes the purposive application to individual decisions of formal, logical, scientific principles. Such a reorientation of education together with an increase in the proportion of the child-bearing population attending school might lead to perceptible decreases in fertility. However, the small percentage of intercountry variation in fertility accounted for by the social and political variables included in our study suggests that the promotion of more rationalistic attitudes will have only moderate effects upon practices of family planning and limitation.

*** See for instance, F.S.C. Northrop, The Taming of the Nations. (Macmillan, 1952), pp. 192 ff.

**** For various points of view on the influence of the spread of non-traditionalistic thought processes upon birth rates, see R. Freedman and P.K. Whelpton, "Fertility Planning and Fertility Rates by Adherence to Traditions," The Millbank Memorial Fund Quarterly, XXX (Jan. 1952), pp. 61-90, and A. Myrdal, Nation and Family (London, 1945), p. 52.