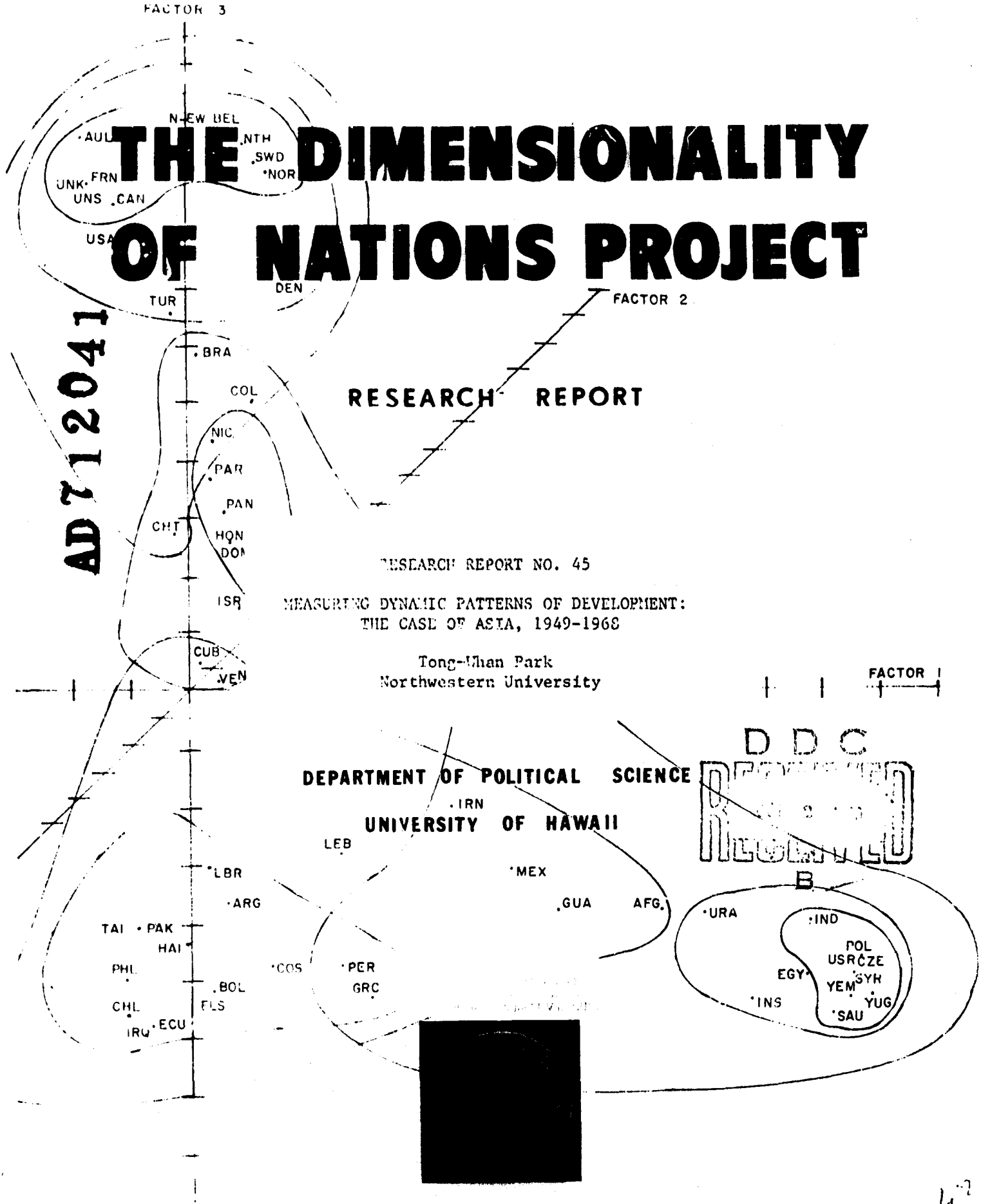

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MEASURING DYNAMIC PATTERNS OF DEVELOPMENT:
THE CASE OF ASIA, 1949-1968

Tong-Whan Park
Northwestern University

DEPARTMENT OF POLITICAL SCIENCE
UNIVERSITY OF HAWAII

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13 ABSTRACT

The research reported upon here is a first step toward the building of a general theory of development in Asia. There are three tasks involved in this attempt: (1) the delineation of patterns of development; (2) the determination of linkages between national characteristics and the behavior of nations over time; and (3) the construction of an all-computer simulation model to experiment on the potential effects of controls.

Data were collected on 48 measures of national characteristics for 21 Asian countries over a twenty-year period, 1949-1968. These data were factor analyzed to determine patterns of interrelationship between variables over both nations and years. A number of statistically independent dimensions were found including dimensions of power capability, political orientation, wealth, density, health, Christianity, trade, and diplomatic transactions.

Factor scores for a specific nation in each year were calculated to plot the nation's changing position along four major dimensions of development: power capacility, wealth, trade, and diplomatic transactions.

In order to examine changes in Asia as a region, the factor scores of each Asian country were aggregated on a yearly basis. Then these yearly sums were plotted over time. This procedure led to the following observations. (1) Diplomatic transactions have increased at a remarkably high rate; (2) trade has made a dramatic jump since 1964; (3) power capability, though having increased, has not changed as much as other patterns throughout the entire period; and (4) the level of wealth experienced a big increase in 1968.

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14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Asia (1949-1968)						
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change over time						
patterns						
dimensions						
all-computer simulation						
field theory						
super P-factor analysis						
power capability						
political orientation						
wealth						
density						
health						
Christianity						
trade						
diplomatic transactions						

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(1966) to name a few. Recently, however, a tremendous amount of academic energy is being exploited to understand specific problems of development. Korea, for example, has seen a number of scholarly works which attempted to explain certain aspects of development such as economic planning (Adelman, 1969; Kim, 1969; Lyman and Cole, 1970), administration (Lee, 1968), and even politics (Henderson, 1968; Oh, 1968). Similar developments can be traced in other Asian countries.

What needs to be done now is the integration of numerous theories and evidences of previous scholarly enterprises into a larger, more encompassing framework. The present report is part of this attempt to build a general theory of development involving three tasks: (1) the delineation of patterns of development; (2) the unfolding of linkages between national characteristics and the behavior of nations over time, and (3) the construction of an all-computer simulation model to experiment on the potential effects of controls.

Task 1. Pattern Delineation. Development is defined as a multidimensional process of change within which environmental and behavioral factors interact in complex ways. A certain stage of development is, therefore, the consequence of interaction among such forces as political, economic, socio-cultural, etc. Each of these forces is also a product of interaction among a number of elements. Political force, for example, is shaped by a complex function consisting of institutional types, performance style, and personality variables.

This definition might sound value-free. It is value-free in a sense that it overrides any particular value system governing specific cases. One country might emphasize higher education, while the other would rather invest in heavy industry. This form of differential weighting could be picked up empirically by searching for the clusters of variation among nations. Our definition of development is not totally devoid of value, however. The under-

lying value here is "progress and harmony" (which happens to be the central theme of Osaka Expo '70). An analogy is drawn to clarify this guiding principle. Developing a country is like raising a child. A child can grow healthy both physically and intellectually when he is given a nutritionally balanced diet, parental love and a digestable amount of knowledge. Should one of these be missing or overdosed, the child is likely to become abnormal. Likewise, the successful development of a country depends upon good planning geared to progress and balance.

Just as one child is different from another, each country has its own distinctive characteristics. Naturally, prescriptions for development become unique to each country. This is what causes variation among countries. Below this surface level, however, there exist some fundamental forces or patterns which mold nation/state systems. Politics, economics, socio-cultural institutions are these forces, to name a few.

Task 1 is designed to delineate major patterns of development in Asia during the last 20-year period, 1949-1968. Only when the basic patterns are empirically defined, can we make reliable trend forecasts into the future.

Task 2. Linkages Between Attributes and Behavior. Like most theories of national behavior, the present model is based upon a paradigm. A paradigm is in essence a general theory which produces a particular Weltanschauung. The paradigm employed here is a social field theory developed by Professor R. J. Rummel (1965, 1969a, 1970a). Simply put, the theory postulates that the behavior of nations toward each other is result of their differences and similarities in attributes. Attributes refer to characteristics describing nations, while behavior is an interaction which links a pair of countries (dyad).

Attributes and behavior are operating in the theory not in terms of their absolute magnitudes but relative to others at a point in time. This

notion of relativity could be extended over time to fit the present model. We often say that in 1970 nation A has reached the wealth level of nation B in 1930. Or, GNP is said to have doubled in 20 years, etc. Therefore, it is important that forces of development are scaled to account for this relativity toward others over a time span.

A schematic representation of the paradigm linking attributes and behavior over time is given in Figure I. A and B refer to attribute and

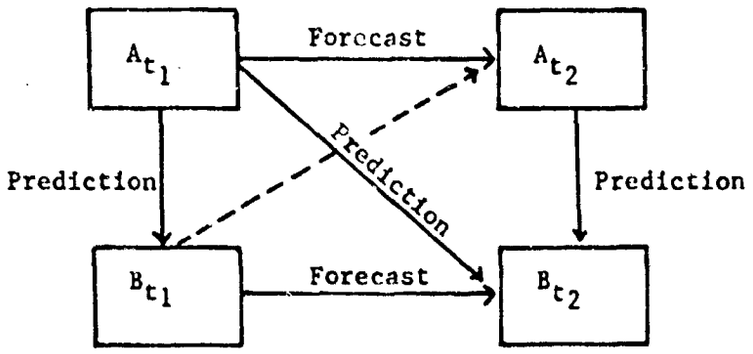

FIGURE I.

behavior space respectively, whereas subscripts t_1 and t_2 give time points. Two horizontal arrows are labelled as forecasts. Forecasting is the projection of trend patterns into the future. Two vertical arrows relate attributes and behavior at one time slice, thus called predictions.[2] In addition, there is one diagonal arrow with a prediction label, too. This combines attributes at t_1 with behavior at t_2 in order to examine the existence of time lags in causal networks. The dotted line arrow extending from B_{t_1} to A_{t_2} is not

[2] The previous application of this model (Park, 1969) to Asia for 1955 and 1963 has demonstrated a strong predictive capability.

theoretically important. Past behavior is by definition a portion of present attributes. Task 2 uncovers the strength and configuration of these arrows sketched in the diagram.

Task 3. All-Computer Simulation. Given the patterns of change over time empirically defined and a knowledge of the interrelationships between attributes and behavior, the next logical step of research should be geared to the control of change. At this juncture, we are loaded with "what if?" questions. What would happen, if the system has a different rate of economic development? What would be the effects on the regional stability, if a nation swings back and forth on the ideology scale? What changes would be produced by an increasing participation of youth in decision-making? Or, simply, what if World War III breaks out?

No model could generate precise answers to these questions. What it can do is to help us foresee the consequences of alternative futures. The most appropriate method for this purpose is an all-computer simulation. First, we feed in major patterns of development as well as equations for forecasts and prediction. The relationship between the equations are also specified by the analyst. Then comes the experiment with different sets of parameters. By altering the coefficient for GNP, for example, we can explore its effects on other aspects of the system in 10, 20, or even 30 years. Manipulation of parameters, if performed in reality, is equivalent to the control of change. After a series of experimentation with simulation, then one can gain some insight on how to maneuver control to produce a desired state in the future.

III. DATA, OPERATIONALIZATION, AND QUALITY

The Population. The present study analyzes the Asian system, 1949-1968. When a system is defined as "a set of objects together with relation-

ships between the objects and between their attributes" (Hall and Fagen, 1956, p. 18), it must be determined who constitute objects and what the major contents of attributes are. There have been numerous attempts to delineate Asia as a regional system on multiple criteria, none of which were successful (Park, 1969). Since one of our secondary research goals is to examine the clustering of countries over time in terms of their cooperation, a conventional geographic slice with 21 countries is adopted.

As far as the time span is concerned, the year 1949 marks a turning point in Asian history. It was when the giant changed its face: Communist rule of mainland China started. There are two countries which were independent not throughout the entire 20-year period: Malaysia and Singapore. Moreover, there has been a constant argument on the sovereignty of some nations: e.g., Communist China, Taiwan, and North Korea. Since our research interest is in Asia as a system, it is imperative to include as many important international entities as possible. There is a good historical reason to believe that all 21 countries included in the analysis have been existing as international actors since 1949. The countries and their codes used in the present study are given in Table I.

Measures of Development. Two important criteria were considered in selecting operational measures of change: relevance to model building and existence of previous empirical work with similar scholarly attention. Consulted were a number of cross-national studies which searched for major dimensions of variation among nation characteristics. These include (1) Cattell's (1949) factor analysis of 72 widely chosen variables for 69 countries, which extracted 12 dimensions of national syntality; (2) Rummel's (1969b) analysis of 17 dimensional space of nation attributes and dyadic behavior;

TABLE I. 21 ASIAN COUNTRIES AND THEIR CODES

No.	Country	Code
1	Afghanistan	AFG
2	Burma	BUR
3	Cambodia	CAM
4	Ceylon	CEY
5	China (mainland)	CHN
6	Taiwan	CHT
7	India	IND
8	Indonesia	INS
9	Japan	JAP
10	North Korea	KON
11	South Korea	KOS
12	Laos	LAO
13	Nepal	NEP
14	Outer Mongolia	OUT
15	Pakistan	PAK
16	Philippines	PHI
17	Thailand	TAI
18	North Vietnam	VTN
19	South Vietnam	VTS
20	Malaysia	MAL
21	Singapore	SIN

(3) factor analysis of political variables in The Cross-Polity Survey (Banks and Textor, 1963) performed by Gregg and Banks (1965); and (4) a pioneering work on regionalism by Russett (1967).

Of course, a heavy emphasis was given to the so-called development variables, such as wealth and transaction capability. Thus, 36 measures were selected to span general characteristics, while 12 variables were allocated for transaction capabilities encompassing trade, diplomacy, and international organization. Forty-eight variables included in analysis and their codes are presented in Table II. Their operational definitions are given in Appendix I.

Data Quality. The body of data categorized by nations, years, and variables can be conceived to form a cube as shown in Figure II.

There are several points to be clarified in analyzing this data cube.

1. Missing data. There were nearly 30 percent missing cells according to the major sources listed in Appendix I. Various miscellaneous sources--mostly Asian materials--were consulted to reduce the size of missing data down to 5 percent. For this portion, missing entries were estimated employing a technique based upon multiple regression (Wall and Rummel, 1969).

2. Reliability. It is well-known that data on nations are notorious for their low reliability and poor comparability. This problem is even more serious in the developing countries with no adequate data generating facilities. Yet the need for statistics on development variables such as GNP and trade is extreme in these countries for political reasons. Another factor which lowers data quality is that our data cube is a mixture of metric and non-metric scales of measurement. All these add up to a poor ratio between signals and noise. A partial solution to this problem can be obtained by selecting a method which dampens noise and brings out signal. Dealing with patterns rather than raw

TABLE II. VARIABLES AND THEIR CODES

	Variable	Code
General Characteristics	1. Population	POPULATI
	2. National land area	LANDAREA
	3. Arable land area	ARABLAND
	4. Population density	DENSITY
	5. Population/arable land	POP/ARAB
	6. Energy production	ENERGY
	7. Population X energy production	POP*ENRG
	8. Energy production/population	ENRG/POP
	9. Gross National Product	GNP
	10. GNP/population	GNP/POP
	11. Manufacturing/GNP	MANU/GNP
	12. Agricultural production/GNP	AGRI/GNP
	13. National Income	NATLINCM
	14. Bloc membership	BLOCMBSP
	15. Freedom of opposition	FREEDOM
	16. Legality of government change	LEG-GOVC
	17. Voting System	VOTING
	18. No. of political parties	#PARTIES
	19. Defense expenditure	DEFNSEXP
	20. Defense expenditure/GNP	DEF/GNP
	21. Newspaper circulation/population	NEWS/POP
	22. Telephones/population	TELE/POP
	23. Radio receivers/population	RADI/POP
	24. Vehicles/population	VEHI/POP
	25. Railroad length	RAILROAD
	26. Population/physicians	POP/PHYS
	27. Religions	#RELIGIO
	28. Membership of largest religion/population	LARGRELI
	29. Buddhists/population	BUDD/POP
	30. Mohammedans/population	MOHA/POP
	31. Roman Catholics/population	CATH/POP
	32. Protestants/population	PROT/POP
	33. Languages	#LANGUAG
	34. Membership of the largest language group/population	LARGLANG
	35. Ethnic Groups	#ETHNIC
	36. Membership of the largest ethnic group/population	LARGETHN
Transaction Capabilities	37. Embassies and legations in other nations in the world	EMBINWOR
	38. Embassies and legations in other nations in Asia	EMBINASI
	39. Embassies and legations from other nations in the world	EMBFRWOR
	40. Embassies and legations from other nations in Asia	EMBFRASI
	41. Intergovernmental international organizations of which a member (Global IGO)	IGO-GLOB
	42. Asian intergovernmental international organizations of which a member (Asian IGO)	IGO-ASIA
	43. Private international organizations of which a member (Global NGO)	NGO-GLOB
	44. Asian private international organizations of which a member (Asian NGO)	NGO-ASIA
	45. Exports (Global)	EXP-GLOB
	46. Exports (Asian)	EXP-ASIA
	47. Imports (Global)	IMP-GLOB
	48. Imports (Asian)	IMP-ASIA

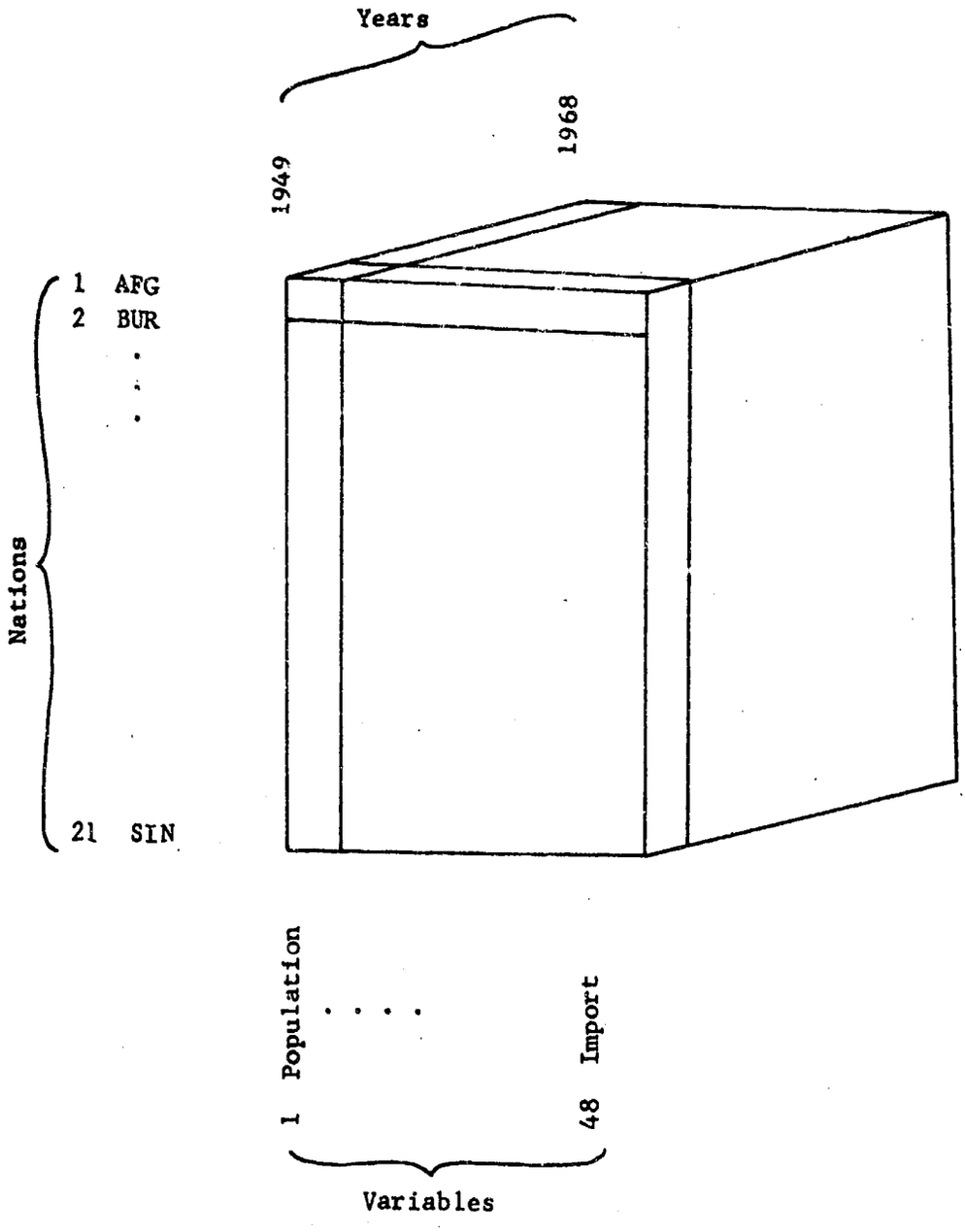

FIGURE II. DATA CUBE

scores produces such a practical advantage in addition to theoretical import.

3. Transformation. Since the research aims at the population of Asian countries rather than any type of sample, no attempt was made to transform variables to normal distribution. The only transformation performed was the standardization of a variable over time and nations, equating means and standard deviations of each variable. This form of standardization is dictated by the philosophical tenet of the paradigm employed: Asian space-time relativity.

IV. PATTERNS OF ASIAN DEVELOPMENT

Method: Super P-Factor Analysis. Our interest is in delineating patterns of development across nations over time. This results in a deviation from normal two-facet analysis. Two-facet matrices generated by slicing the data cube of Figure II horizontally will have variables in columns and time points in rows for a specific nation. Factor analysis done on this frame is called P-analysis.

In order to handle time patterns for all countries, however, we can cut a series of yearly slices from the data cube. Each slice is a vertical frame identified as R-matrix. Then these slices are stacked in "freight-car" fashion, one behind the other as in Figure III. This supermatrix is factor analyzed to determine the patterns of interrelationship between variables over both nations and years.[3] A pattern (factor) loading matrix then gives the clustering of variables in terms of their similarity in variation over time and nations. Moreover, a pattern score matrix is computed which generates a score for each nation for each year on these patterns. These scores are used to plot each nation's change over time.

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[3]For the mathematics of factor analysis, see Rummel (1970b). A previous application of super P-factor analysis on some 25 conflict measures over nation pairs by months in 1963 found this technique very useful in over-time pattern delineation (Phillips, 1969).

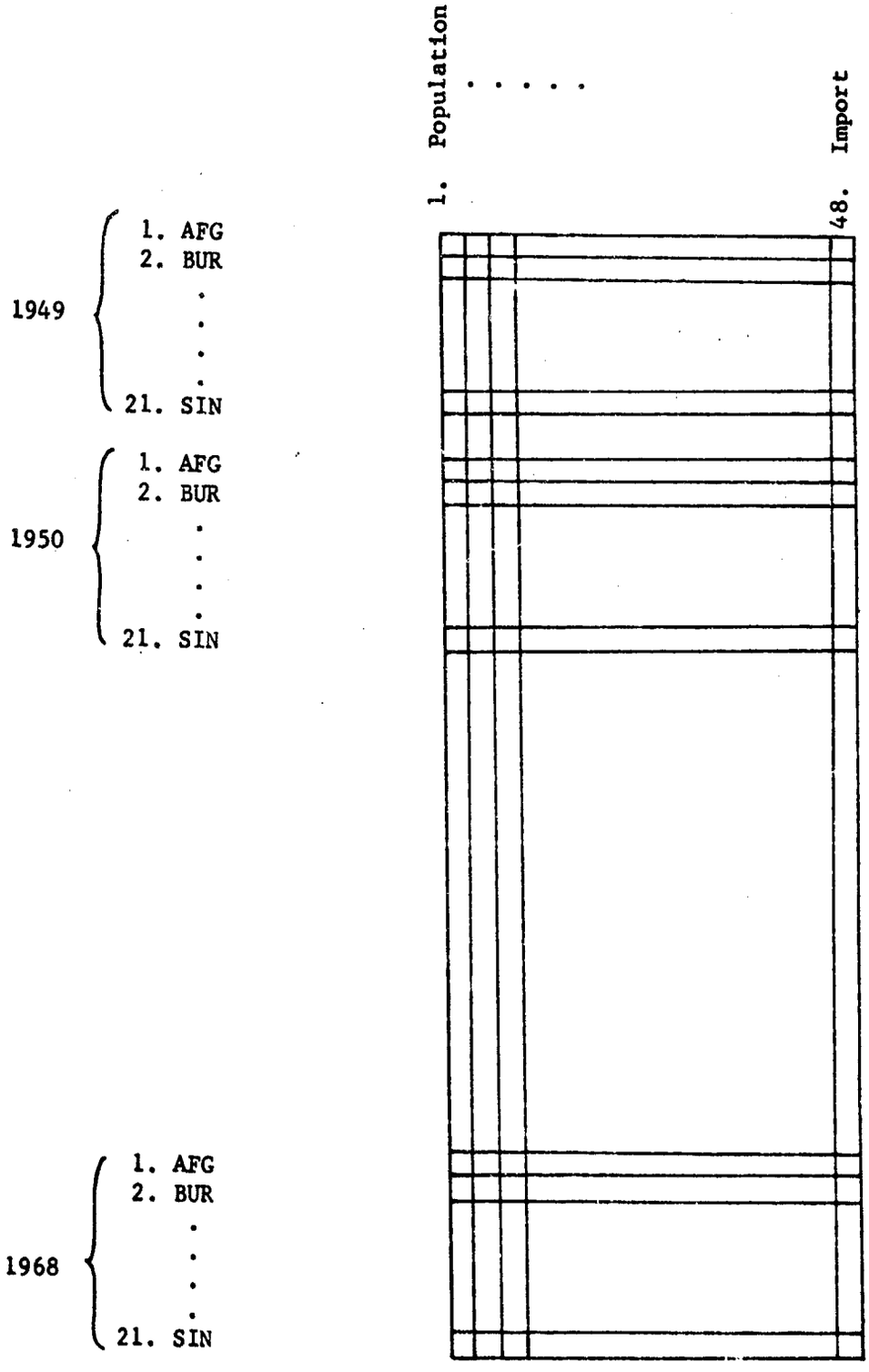


FIGURE III. SUPER-P MATRIX

Dimensions of Asian Development. The data matrix as shown in Figure III was factor analyzed employing principal component solution. The principal axis solution was applied to a matrix of intercorrelation between variables. The Pearson product-moment correlation matrix is presented in Table III. Component analysis was chosen because the specific variance is important in the description of Asian development.

In order to delineate a simple structure, varimax orthogonal rotation was performed on those dimensions with eigenvalues greater than one. The orthogonal rotation defines patterns which are uncorrelated with each other, thus uncovering distinct clusters of interrelationships when they exist in the data. Table IV presents the rotated factor loading matrix, where a loading measures correlation between a variable and a factor.

Eleven dimensions were delineated accounting for 84 percent of the total variance. The component (factor) scores for these dimensions were calculated, employing the formula

$$S_{nxp} = Z_{nxm} F_{mxp} (F'_{pxm} F_{mxp})^{-1}$$

where S = the matrix of scores
Z = the standardized data matrix
F = the rotated factor matrix (Table IV)
n = the number of cases
m = the number of variables
p = the number of dimensions.

These scores are helpful in the substantive interpretation of dimensions and will be used to plot changes in the next section.

Only those dimensions which are important in terms of variance accountability and theoretically meaningful ones will be interpreted. The largest dimension, accounting for 14.5 percent of total variance, consists of population (.94), land area (.93), energy production (.93), population x energy production (.92), defense expenditure (.90), arable land (.75), railroad (.70),

TABLE III. PRODUCT MOMENT CORRELATION MATRIX[a]

NO.	VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	POPULATI																								
2	LANDAREA	93																							
3	ARABLAND	90	74																						
4	DENSITY	-09	-12	-09																					
5	POP/ARAB	-09	-10	-11	97																				
6	ENERGY	82	80	60	-06	-04																			
7	POP*ENRG	80	81	57	-05	-04	97																		
8	ENRG/POP	06	09	00	-06	-05	18	10																	
9	GNP	69	55	59	-04	-03	68	55	17																
10	GNP/POP	-11	-08	-13	25	24	-03	-07	76	19															
11	MANU/GNP	19	15	09	68	65	29	24	23	27	26														
12	AGRI/GNP	-08	00	01	-49	-44	-21	-14	-16	-29	-24	-66													
13	NATLINCM	73	61	61	-05	-04	73	61	17	99	17	27	-28												
14	BLOCMBSP	-30	-42	-24	27	23	-27	-31	-24	-05	05	-07	-39	-07											
15	FREEDOM	-06	-22	05	25	21	-11	-17	-19	11	07	-02	-23	09	52										
16	LEG-GOVC	-15	-28	-03	15	13	-19	-24	-30	01	-02	-23	06	-01	41	75									
17	VOTING	-11	-23	-01	19	15	-15	-18	-20	03	00	-12	02	02	41	51	62								
18	#PARTIES	11	-00	13	16	15	12	04	09	31	15	19	-37	29	20	27	14	22							
19	DEFNSEXP	82	82	58	-07	-05	88	89	12	63	-03	27	-18	68	-30	-17	-25	-19	09						
20	DEF/GNP	-06	-04	-11	-07	-06	00	03	07	-13	-12	17	-11	-12	-25	-21	-32	-20	-07	10	[illegible]				
21	NEWS/POP	-06	-13	-15	47	47	12	-05	23	47	44	47	-55	43	36	33	20	23	41	00	-17				
22	TELE/POP	-05	-10	-11	35	35	08	-05	33	58	62	38	-42	54	24	23	14	16	31	02	-15	82			
23	RADI/POP	-11	-15	-17	43	45	04	-07	55	32	73	43	-50	29	25	13	05	13	31	-02	-11	74	75		
24	VEHI/POP	-11	-17	-15	71	70	-02	-08	-02	36	45	52	-54	33	36	37	29	25	28	-05	-17	73	78	64	

[a] Correlation coefficients rounded off and multiplied by 100. Coefficients $\geq |.30|$ are underlined. N = 420.

TABLE III (continued). PRODUCT MOMENT CORRELATION MATRIX

NO.	VARIABLES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
25	RAILROAD	85	64	94	-08	-09	59	49	08	71	-05	14	-10	73	-13	15	04	07	23	54	-14	11	09	00	-03
26	POP/PHYS	-08	-07	-08	-09	-08	-07	-05	-10	-10	-10	-18	30	-10	-07	-03	18	05	-16	08	-12	-13	-10	-14	-11
27	#RELIGIO	17	12	16	28	24	10	10	-23	04	-08	03	-29	06	43	40	26	14	23	11	-21	01	-03	-02	17
28	LANGFELI	09	14	17	-09	-08	-03	00	-19	-01	00	-35	41	00	09	-09	13	08	-06	-04	-39	-15	-09	-11	-12
29	BUDD/POP	-30	-17	-32	-05	-03	-18	-13	-03	-23	12	-13	11	-24	-17	-15	-19	-17	-17	-19	-03	02	03	09	-01
30	MOSA/POP	-03	-02	-01	-06	-04	-09	-10	-13	-07	-10	-26	35	-06	13	-02	30	15	-15	-08	-22	-15	-11	-18	-03
31	CATH/POP	-08	-09	-06	-06	-07	-09	-06	-11	-06	-01	-03	-12	-06	24	27	19	04	24	-07	-10	-08	-06	-07	-02
32	PROT/POP	-12	-14	-14	-05	-06	-11	-10	-07	-08	-04	-10	-14	-09	34	32	20	11	25	-09	-07	-04	-05	-04	-05
33	#LANGUAG	35	15	59	04	01	05	07	-26	15	-16	03	07	15	11	26	24	19	16	06	-16	-24	-18	-19	-04
34	LARGLANG	-10	-04	-26	09	11	10	06	27	07	12	32	-38	06	-11	-26	-47	-22	-03	09	37	31	23	31	07
35	#ETHNIC	-11	-10	02	-07	-06	-22	-15	-24	-26	-18	-24	39	-26	-18	-19	02	-04	-18	-18	-03	-35	-27	-25	-18
36	LARGETHN	-02	05	-21	05	06	16	13	25	11	11	38	-50	10	05	-21	-42	-23	14	17	37	25	19	26	03
37	EMBINWOR	31	11	40	-11	-12	22	12	02	55	02	-05	-12	54	24	14	12	18	26	22	-23	22	29	24	14
38	EMBINASI	26	12	34	-16	-16	19	13	-07	39	-04	-14	-08	39	20	12	17	15	20	18	-26	09	13	13	08
39	EMBFRWOR	37	19	47	-12	-12	26	17	00	56	03	-05	-10	55	14	14	15	14	25	24	-25	19	26	21	16
40	EMBFRASI	29	16	36	-14	-13	21	16	-05	44	02	-12	-09	43	17	13	16	13	21	19	-19	14	21	20	15
41	IGO-GLOB	10	-09	22	-05	-05	02	-08	-07	38	02	-15	-17	35	43	30	28	29	30	-02	-24	28	27	24	20
42	IGO-ASIA	10	02	14	00	01	07	07	-11	17	00	-08	-07	17	20	11	08	08	06	12	-17	04	10	14	14
43	NGO-GLOB	28	04	38	01	-01	20	06	07	69	18	08	-35	66	34	36	21	21	45	16	-23	48	52	38	39
44	NGO-ASIA	06	-10	15	02	00	00	-07	-05	24	04	-02	-28	22	43	33	21	15	24	00	-18	20	19	23	22
45	EXP-GLOB	29	17	24	14	13	35	19	13	76	29	29	-39	73	20	27	18	15	34	24	-20	67	71	46	54
46	EXP-ASIA	14	09	06	11	12	25	19	09	56	25	20	-27	54	09	08	03	03	21	26	-07	41	60	37	50
47	IMP-GLOB	30	14	29	15	14	33	16	14	77	28	30	-40	73	23	31	19	18	37	22	-21	69	70	47	52
48	IMP-ASIA	07	02	02	19	21	15	08	07	49	27	21	-29	47	16	12	06	06	21	15	-09	43	60	43	55

TABLE III (continued). PRODUCT MOMENT CORRELATION MATRIX

NO.	VARIABLES	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
25	RAILROAD																								
26	POP/PHYS	-11																							
27	#RELIGIO	11	-04																						
28	LARGRELI	11	-09	15																					
29	BUDD/POP	-33	04	-20	27																				
30	MOHA/POP	-03	00	01	33	-52																			
31	CATH/POP	-11	-07	26	11	-24	-12																		
32	PROT/POP	-15	-10	49	01	-33	-09	84																	
33	#LANGUAG	52	-08	21	33	-29	01	48	25																
34	LARGLANG	-16	-22	-33	-35	41	-53	-37	-21	-57															
35	#ETHNIC	-07	-07	04	53	29	32	-31	-39	16	-21														
36	LARGLTIN	-15	-30	-11	-24	09	-51	26	33	-21	71	-37													
37	EMBINSOR	49	-15	12	19	-30	23	01	05	27	-20	-01	-20												
38	EMBINASI	38	-15	17	26	-14	19	12	09	28	-30	04	-28	87											
39	EMBFRSOR	54	-19	10	26	-23	25	02	00	32	-26	06	-28	91	89										
40	EMBFRASI	39	-18	15	30	-08	18	08	03	29	-28	08	-26	80	91	93									
41	IGO-GLOB	33	-16	22	25	-16	15	15	18	26	-19	00	-15	75	73	76	72								
42	IGO-ASIA	13	-07	13	17	-01	08	13	09	16	-19	-02	-18	53	60	55	61	51							
43	NGO-GLOB	54	-17	20	06	-25	01	13	15	29	-11	-16	-06	81	67	80	69	77	46						
44	NGO-ASIA	21	-09	32	02	-22	08	17	23	21	-20	-10	-12	62	57	59	57	57	44	65					
45	EXP-GLOB	43	-11	08	-04	-15	-03	-02	-04	04	06	-25	07	46	32	46	37	37	03	64	28				
46	EXP-ASIA	16	-06	02	-03	-03	-06	00	00	-05	11	-15	14	36	26	32	29	21	11	44	24	73			
47	IMP-GLOB	48	-12	06	-04	-16	-07	-02	-03	10	09	-26	09	51	34	49	38	44	06	70	31	98	68		
48	IMP-ASIA	12	-07	05	-03	-03	-06	02	03	-04	11	-15	12	37	26	33	30	27	13	46	31	70	96	67	

TABLE IV. ORTHOGONALLY ROTATED DIMENSIONS[a]

NO.	VARIABLES	Dimensions 1	2	3	4	5	6	7	8	9	10	11	h^2
1	POPULATI	94	04	14	-03	-04	-02	-04	00	-04	-25	03	97
2	LANDAREA	93	-01	-03	-17	-01	-04	-01	10	-04	-07	-01	91
3	ARABLAND	75	-03	25	06	-10	-05	-07	04	-06	-54	00	95
4	DENSITY	-07	07	-10	16	-02	95	05	02	-02	-02	02	95
5	POP/ARAB	-06	09	-11	11	-04	94	05	03	-02	00	01	92
6	ENERGY	93	14	06	-08	-00	02	04	-06	01	12	03	91
7	POP*ENRG	92	03	-00	-16	05	04	-05	00	03	13	-03	89
8	ENRG/POP	10	02	-05	-23	-04	-08	88	-16	-03	03	10	89
9	GNP	65	59	30	12	-08	-03	17	-10	03	-11	09	93
10	GNP/POP	-08	23	-01	-02	03	21	88	10	04	02	-04	89
11	MANU/GNP	21	19	-11	-19	-03	74	17	-31	06	-14	18	86
12	AGRI/GNP	-12	-20	-16	-09	-20	-56	-11	40	-20	-13	-37	82
13	NATLINCM	70	55	29	10	-07	-03	16	-09	01	-09	08	94
14	BLOCMBSP	-30	10	29	55	31	22	-08	00	-06	24	18	73
15	FREEDOM	-08	10	13	79	22	16	-05	-10	05	-12	-06	76
16	LEG-GOVC	-17	10	09	78	09	03	-09	12	-19	-08	-24	78	
17	VOTING	-13	05	10	57	-05	05	-04	03	-10	-05	-01	57
18	#PARTIES	08	20	19	30	23	12	18	-12	08	-19	30	41
19	DEFNSEXP	90	11	07	-19	04	04	-04	-07	-01	11	02	88
20	DEF/GNP	-07	-08	-18	-38	-11	-01	-19	-48	05	-05	30	55
21	NEWS/POP	-01	53	11	37	-11	38	39	-15	15	18	21	86
22	TELE'POP	-03	70	15	18	-08	29	48	-05	09	10	06	88
23	RADI/POP	-09	35	21	09	-04	41	07	-06	15	15	12	87
24	VEHI/POP	-11	54	12	24	-03	69	17	00	02	07	-03	89
25	RAILROAD	70	12	29	20	-16	-07	04	-04	-02	-51	09	94
26	POP/PHYS	-04	-01	-15	11	-06	-12	-05	-13	05	04	-78	69
27	#RELIGIO	20	-10	17	34	48	33	-21	19	-06	11	02	63
28	LARGRELI	04	-04	17	14	07	-12	-03	90	-02	-08	07	88
29	BUDD/POP	-22	-01	-11	-14	-25	-04	03	39	79	19	-07	96
30	MOHA/POP	-07	-04	14	09	-15	-07	-06	29	-88	13	-05	95
31	CATH/POP	-10	01	06	04	91	-06	00	00	02	-23	00	90
32	PROT/POP	-10	-03	07	15	92	-08	-02	-09	-05	02	11	91
33	#LANGUAG	15	-07	22	13	32	06	-18	21	-05	-80	-02	91
34	LARGLANG	00	14	-20	-23	-27	07	11	-32	52	36	44	90
35	#ETHNIC	-18	-16	03	-14	-38	-02	-26	65	-09	-17	10	77
36	LARGETHN	07	16	-24	-27	35	06	11	-31	36	20	56	87
37	ENGINWOR	17	26	85	08	-05	-09	04	01	-17	-09	09	89
38	ENGINASI	14	11	90	04	03	-09	-03	12	-07	-05	-01	87
39	ENGFRWOR	22	23	87	06	-08	-07	05	10	-14	-16	06	94
40	ENGFRASI	16	16	88	02	-01	-06	00	17	-03	-07	01	87
41	IGO-GLOB	-03	17	29	29	06	-07	03	08	-02	-06	18	79
42	IGO-ASIA	04	-09	27	-06	10	12	-02	07	10	11	-20	69
43	NGO-GLOB	15	42	23	27	06	01	15	-11	02	-19	15	90

TABLE IV(continued)

NO.	VARIABLES	1	2	3	4	5	6	7	8	9	10	11	h^2
44	NGO-ASIA	-06	12	73	16	19	09	-02	-13	-06	00	-01	64
45	EXP-GLOB	25	83	21	24	-05	08	15	-06	-02	-06	11	90
46	EXP-ASIA	11	90	16	-13	08	09	-01	02	00	08	-07	89
47	IMP-GLOB	24	79	25	29	-06	07	16	-09	03	-13	15	90
48	IMP-ASIA	01	88	21	-11	09	17	-01	02	00	06	-07	87
Total Variance(%)		14.5	11.4	13.5	7.3	5.9	8.2	5.9	5.3	4.3	4.1	3.8	

[a]Varimax rotation of the principal axes of a product moment correlation matrix. Component model. All components with eigenvalues $\geq$ 1.00 were rotated. Loadings and communality are multiplied by 100. Loadings $\geq$ |.30| are underlined. Signs for components 1 and 2 are reversed.

national income (.70), GNP (.65), and bloc membership (-.30). This dimension is named power capability, since it covers most sources of power discussed in the international relations literature. Palmer and Perkins (1957), for example, list seven contributing elements to power: geography, natural resources, technology, population, ideology, morale, and leadership. Among these, morale and leadership are not tapped by this dimension for the attitude and personality variables were not included in our study.

One minor but interesting note about the power capability dimension is that bloc membership is loaded negatively though marginal in its magnitude. This indicates that those nations low on bloc membership scale (Communist = 0, neutral = 1, Western = 2) tend to have greater power capability. Examination of factor scores clarifies this point. For the entire period, China (mainland), India, Japan, and Indonesia have dominated the top four positions in this order; whereas the lower end has a mixture of bloc affiliation.

The second dimension with 11.4 percent of total variance involves export to Asian countries (.90), import from Asian countries (.88), export to the world (.83), import from the world (.79), telephones/population (.70), GNP (.59), national income (.55), vehicles/population (.54), newspaper circulation/population (.53), global NGO (.42), and radio receivers/population (.35). It reveals that the trade behavior of nations are highly patterned. Also there is a positive linkage between the within-system trade and the dealings with the entire world. In other words, those nations which trade a lot with other Asian countries, also trade highly with the global market. This dimension further confirms our common sense notion that the economically developed countries tend to trade more. Examination of factor scores show two salient trends: (1) Southeast Asian countries have been high traders throughout the entire time span; (2) Japan jumped into the top rank in the mid-50's and has remained there. A natural label for this dimension is trade.

The third dimension which happens to be the second largest in terms

of variance explained (13.5 percent) is loaded with all the variables of embassies and legations and international organizations: embassies and legations in Asia (.90), those from Asia (.88), those from the world (.87), and those in the world (.85), as well as global IGO (.79), Asian IGO (.77), global NGO (.73), and Asian NGO (.73). This dimension is labelled diplomatic transactions. For the entire period, high scoring nations on this factor have been neutralist bloc countries such as India, Pakistan, Indonesia, etc. As in the case of trade behavior, Japan became active from the mid-50's. Taiwan's trend is also worth noting. Taiwan has maintained a high position which evidences that Chiang's government has been trying hard to win friends and convince the world of their *raison d'être*.

It is very important to note, at this juncture, that diplomatic transaction is statistically independent of other dimensions, especially trade. Quite often, the literature on international transaction identifies (either intuitively or empirically) three main types: trade, formal diplomatic interaction, and international organization (Alger and Brams 1967; Brams 1966). Our findings delineate two types for the Asian system. While trade forms a distinct cluster, formal diplomacy and internatioal organization behavior are found to co-vary. One possible explanation is that the use of NGO as a channel of communication at the civilian level is not high in Asia where the practice of Western style diplomacy is rather novel.

Moving on, the fourth dimension accounting for 7.3 percent of total variance is labeled political orientation. Variables loading high on it are freedom of group opposition (.79), legality of government change (.78), voting system (.72), bloc membership (.55), defense expenditure/GNP (-.38), newspaper circulation/population (.37), and religions (.34). Japan and India have taken the high positive side (polyarchy) most of the time, while the high

negative and delineates totalitarian rules. From a moderate negative loading of defense expenditure/GNP, it can be inferred that totalitarian systems tend to spend more on defense relative to GNP compared to their non-totalitarian neighbors. The correlation of the number of religions with this dimension is largely due to the lack of religious freedom behind the bamboo curtain.

The fifth dimension has two high loading variables: Catholics/population (.91), and Protestants/population (.92). Taking up 5.9 percent of total variance, this dimension has several other variables loosely linked to it: religions (.48), ethnic groups (-.38), membership of the largest ethnic group (.35), languages (.32), and bloc membership (.31). The most appropriate name for this dimension seems to e Christianity. The leader of this group is, of course, the Philippines which has over 80 percent of the Catholic population. The next high positive location is given to South Korea. Then come Taiwan, South Vietnam and Malaysia. The emergence of this factor could bear many socio-cultural implications in terms of sensitiveness toward Western spiritual heritage. These will be clarified when the linkages with behavior variables are determined in Task 2.

The sixth dimension with 8.2 percent of variance depicts a typical phenomenon of modernization. When the population density is high (.95) and especially when the arable land is crowded (.94), then manufacturing is emphasized (.74) while the ratio of agriculture over GNP decreases (-.56). Other variables involved are vehicles/population (.69), radio receivers/population (.41), newspaper circulation/population (.38), and religions (.33). Singapore and Japan are placed at the high end, while Outer Mongolia takes the bottom. This dimension is labelled density.

The seventh dimension is a very popular one. Accounting for 5.9 percent of total variance, it clusters energy production/population (.88) and GNP/

population (.88) at the center. These two variables are well-known as basic indicators of economic development or wealth. Analysis of GNP/population, in particular, has often been equated with the study of development itself. At the periphery of this clustering are also similar type measures such as radio receivers/population (.67), telephones/population (.48), and newspaper circulation/population (.39). Factor scores for nations demonstrate an interesting result. Japan tops this scale except for four years: 1964-1967. During this short period, North Korea takes the lead. This is possible since factor scores are a composite index of several measures. Had we considered GNP per capita only, Japan would never have conceded the highest position. China (mainland) has been continuously low, while the lowest was experienced by North Korea in 1951 when she was virtually swept away. This dimension is named wealth.

The eighth dimension with 5.3 percent of total variance has one high loading variable--membership of the largest religion (.90)--and several moderately linked ones such as membership of the largest ethnic group (.65), defense expenditure/GNP (-.48), agricultural production/GNP (.40), Buddhists/population (.39), memberships of the largest language group (-.32) and ethnic group (-.31), and manufacturing/GNP (-.31). What is delineated by this factor is religious homogeneity and named thusly. Closer examination of variables leads to an impression that this dimension dese some form of agraria, if we call the fifth dimension (density) industria. Developing our inference further, it is worth commenting that agraria and industria are statistically independent rather than forming one continuum. Nations having high positive scores on this dimension are Afghanistan, Burma, and Outer Mongolia.

The ninth dimension is minor (4.3 percent of total variance) but uncovers a delicate aspect of Asian culture. Buddhists/population is

positively loaded (.79), while Mohammedans/population is negatively loaded (-.88). This implies that when a country has a high proportion of Buddhists, it tends to have a low representation of Mohammedans and vice versa. Examples of the former are Cambodia, Thailand, and South Vietnam. The latter comprises Afghanistan, Indonesia, and Pakistan. This dimension is tentatively named Buddhists-Mohammedans Dichotomy. Perhaps an expert in the area of Asian religion could provide a better interpretation.

The tenth dimension is skipped for it lacks a clear interpretation. The last dimension with only 3.8 percent of total variance is named health. Variables clustered are population/physicians (-.78), memberships of the largest ethnic group (.56) and language group (.44), and agricultural production/GNP (-.37). Taiwan has the high positive (high physicians per capita) and Nepal the high negative.

The eleven dimensions found to define the space of Asian development are summarized in Table V.

TABLE V.

ELEVEN DIMENSIONS OF ASIAN DEVELOPMENT

1. Power Capability
2. Trade
3. Diplomatic Transactions
4. Political Orientation
5. Christianity
6. Density
7. Wealth
8. Religious Homogeneity
9. Buddhists-Mohammedans Dichotomy
10. (unnamed)
11. Health

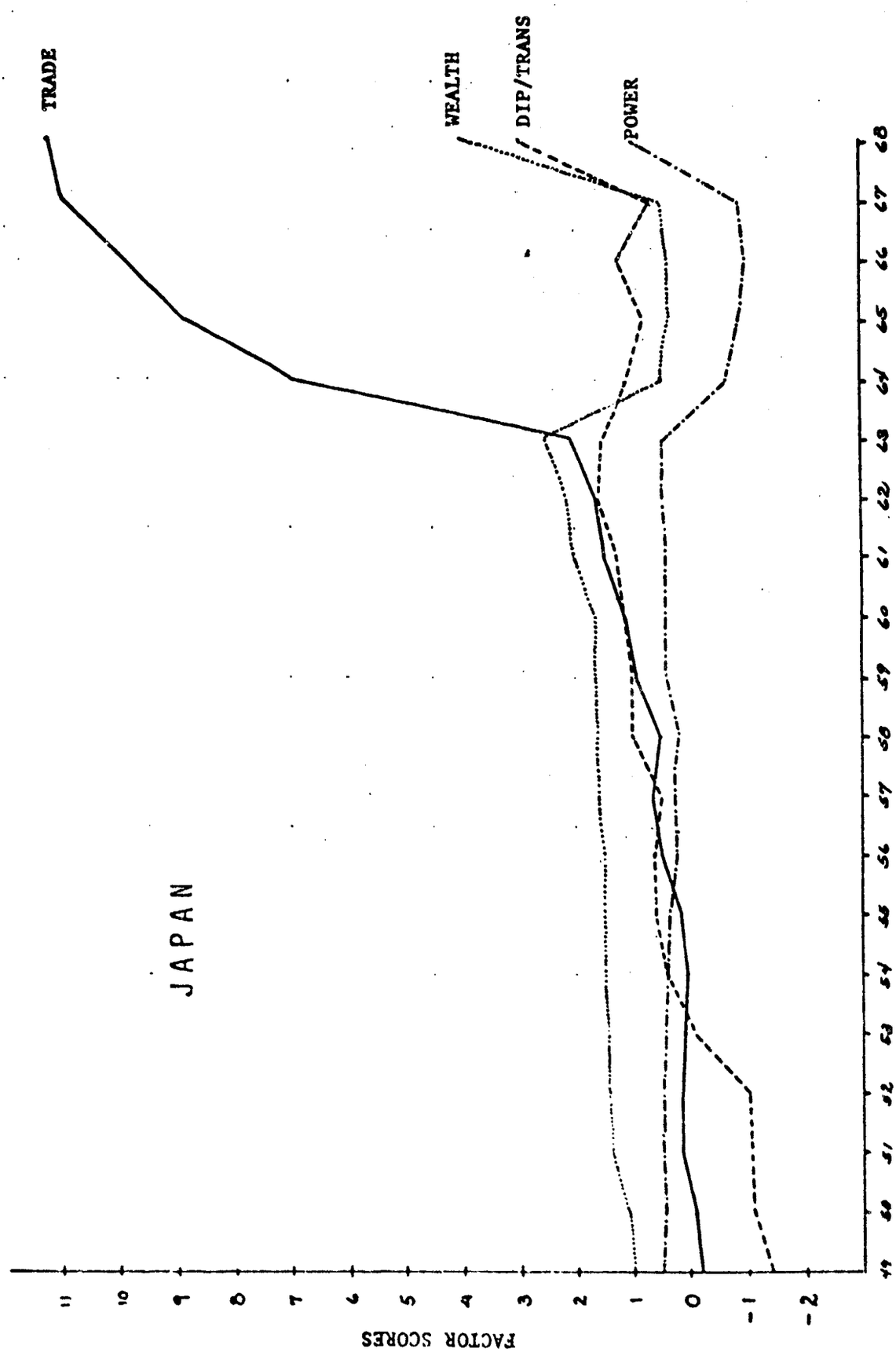
V. CHANGES WITHIN SPECIFIC NATIONS AND THE ASIAN SYSTEM

In section III, we briefly noted the existence of so-called development variables such as wealth and transaction capabilities. These are the elements which can change more easily compared to those in the static category includ-

ing religious, linguistic, and ethnic diversities. These two types are equally important in understanding external behavior of nations. While the static measures (static in the sense that their changes are relatively slow and less vulnerable to control) constitute the backbone of a country, it is the dynamic ones which provide blood and flesh of development. The concept of change-control is directly relevant to these dynamic variables.

Among eleven dimensions delineated, there are four which depict the dynamic aspect of development: power capability, wealth, trade, and diplomatic transactions. Figure IV presents plots of component scores on these four dimensions over 20 years for several countries of interest: Japan, China (mainland), India, Philippines, North Korea, South Korea, Nepal, North Vietnam, and South Vietnam. Though this mapping is self-explanatory, a few points are worth noting. (1) Japan, by far, has the most colorful curves. Especially her upward move in trade after 1963 is extreme, though the rate of change has been decreasing. Judging from the general trend of trade, this reflects that other Asian countries have constantly increased their trade, often winning Japan's previous market. (2) The power capability of China (mainland) has been soaring up, though her wealth did not enjoy much improvement. (3) India has not made any significant progress since 1949 despite several economic development plans. (4) Comparing the two Koreas, the Northern half has significantly upgraded its wealth (mostly energy production per capita) after the Korean War, whereas the South has considerably increased her diplomatic contacts. (5) For most countries, the curves are horizontal, revealing that changes are minimal. This supports our contention that development has received a tremendous amount of lip service, while decision-makers were not equipped with both mental posture and practical know-how of development. A prime exception to this trend is Japan. Thus, it is not surprising to see an argument that Japan is not an

FIGURE IV. SCORES FOR SPECIFIC NATIONS



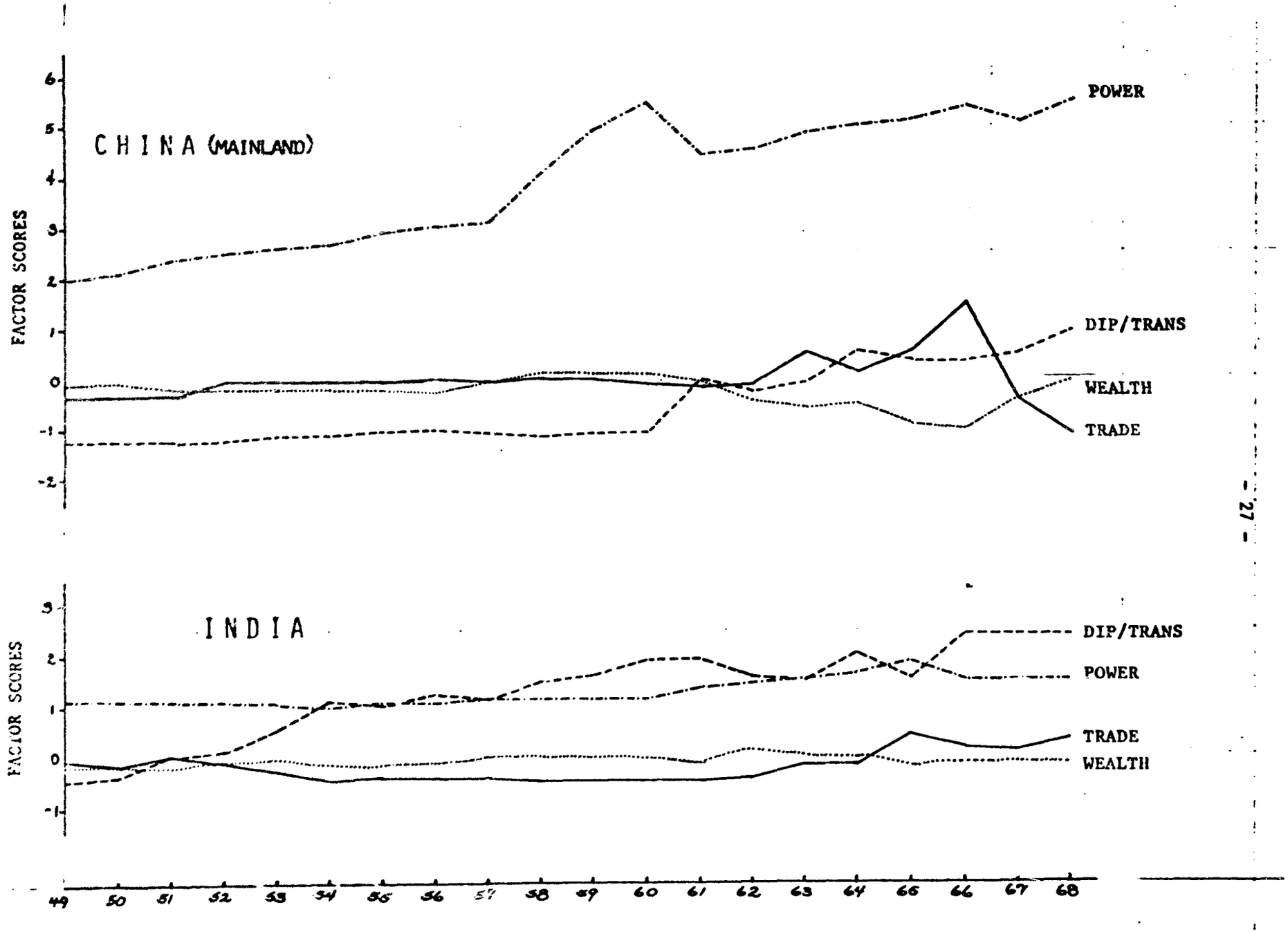


FIGURE IV. (Continued)

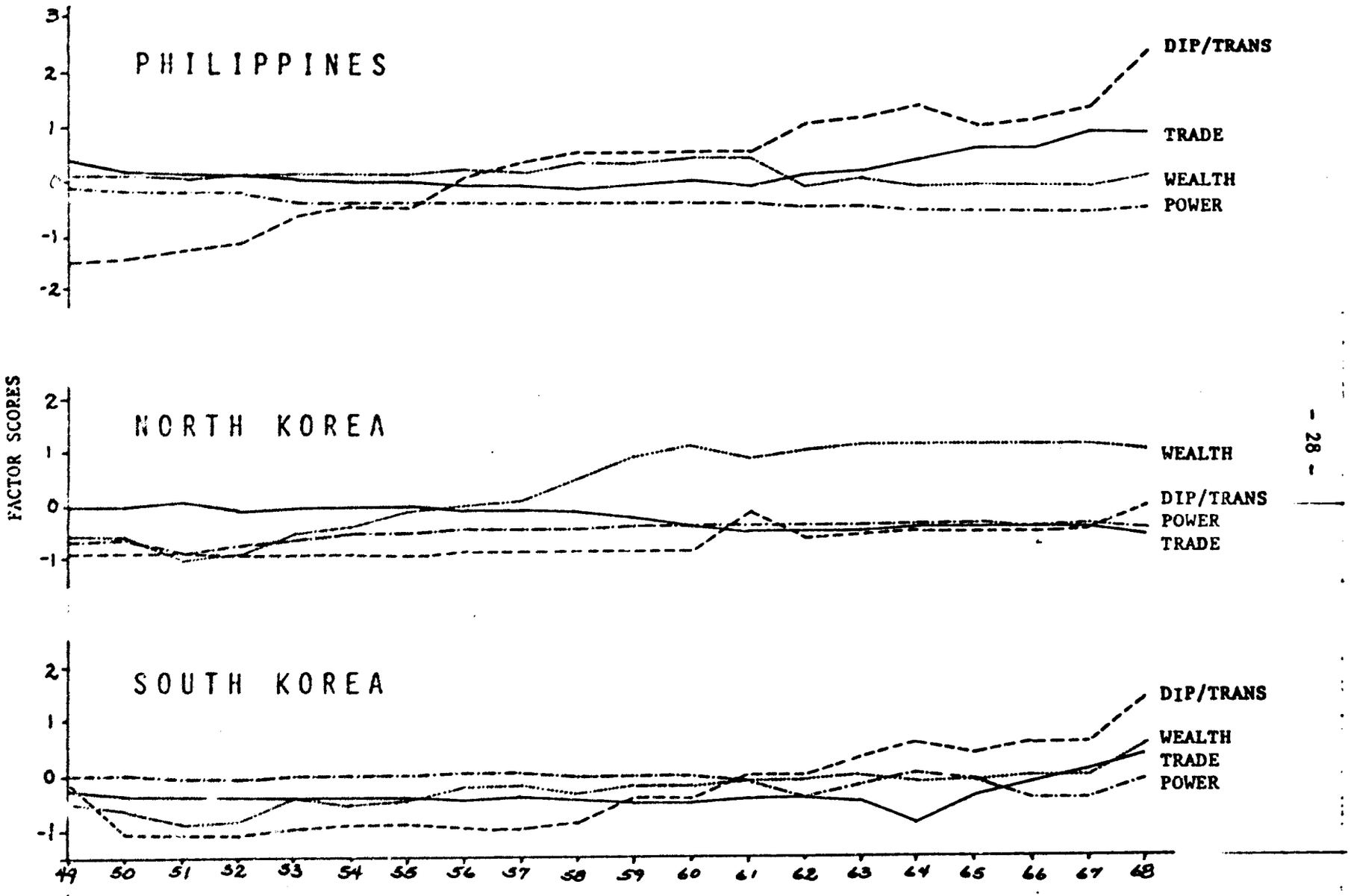


FIGURE IV. (Continued)

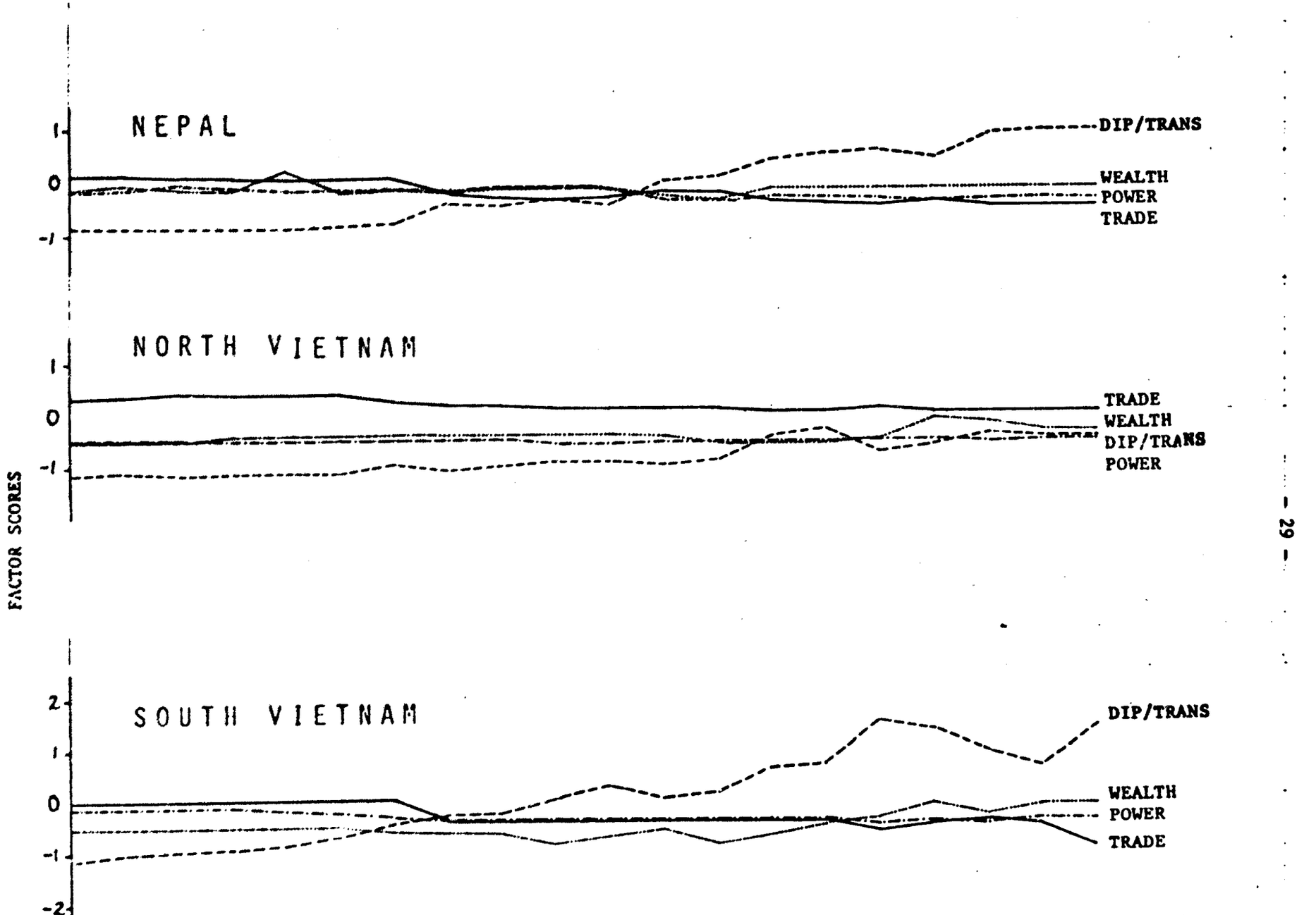


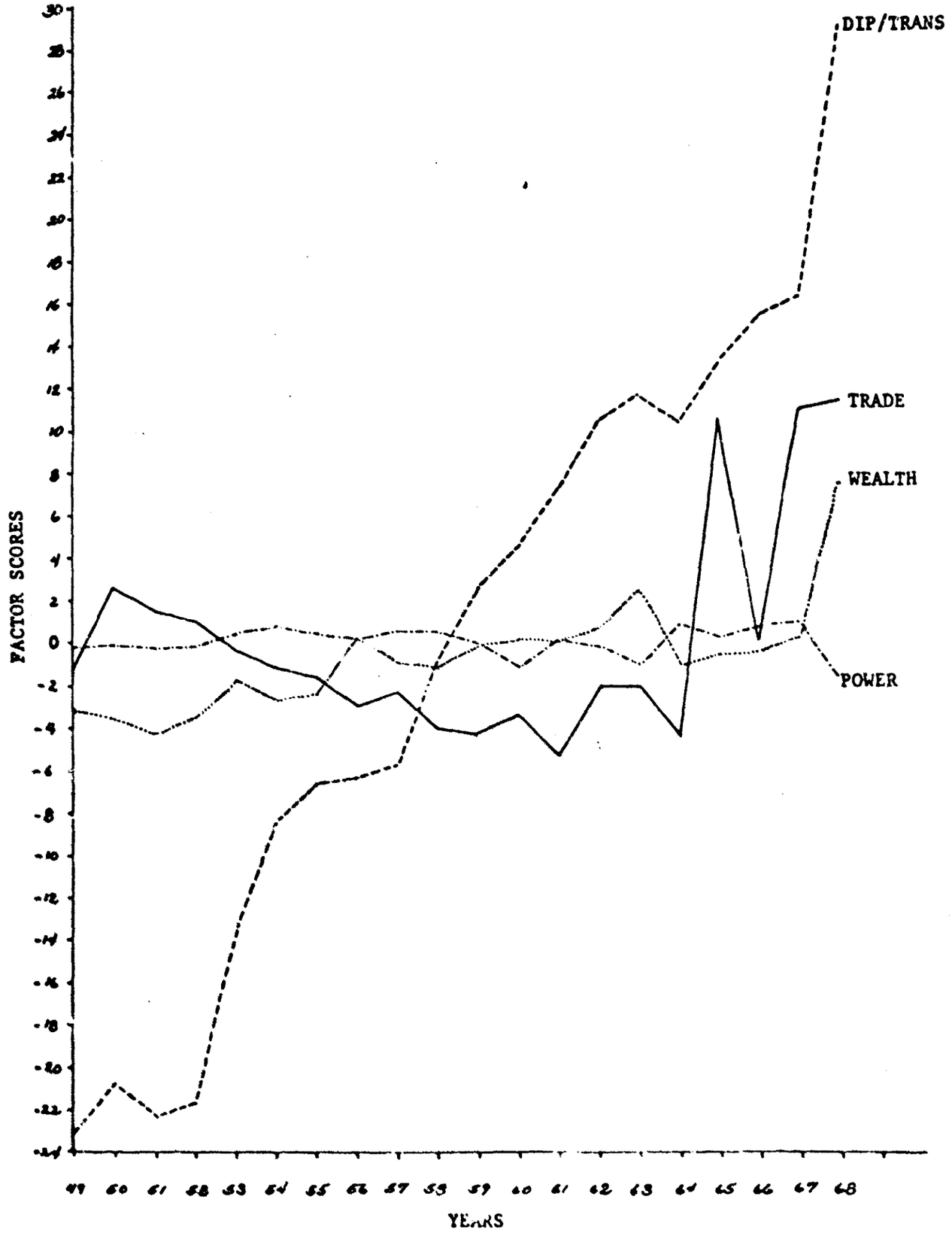
FIGURE IV. (Continued)

Asian country except on the geographical criterion (Russett, 1967).

In addition to the individual nation's paths, it is important to examine changes in the Asian system as a whole. For this purpose, scores of 21 countries were aggregated for each year. Then, these yearly sums were plotted over time (Figure V). Some of the salient characteristics of this mapping are as follows. (1) Diplomatic transactions have demonstrated a near linear increase. It indicates that communication channels within Asia and toward the world have been increasing steadily at a very constant rate. (2) Trade has made a dramatic jump since 1964. (3) The year 1968 saw a big leap in the wealth level. (4) Power capability, though having increased, has not changed as much as other patterns throughout the entire period.

Having delineated major patterns of change, the next problem is to fit functions to them which will help forecast the future state of the Asian system. Equations will be worked out for nations as well as the totality of the system. Then, the linkage between attribute distance and dyadic behavior over time is to be clarified in order to experiment on the alternative consequences of change-control employing an all-computer simulation model. These are the targets of Tasks 2 and 3.

FIGURE V. SYSTEMIC CHANGE



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APPENDIX I

Variable Definition and Data Source*

1. Population. Represents both census and estimates and are "modified present-in-ara counts. This means that they include data for jungle tribes, aborigines, nomadic peoples, displaced persons, and refugees, as well as national armed forces and diplomatic personnel stationed outside the territory, and that they exclude alien armed forces, alien diplomatic personnel, and enemy prisoners of war stationed inside the country." (Demographic Yearbook, UN, 1956, p. 21).
Source: Demographic Yearbook, UN.

2. National land area. National land area relates "to the total area of the specified geographical units, including inland water as well as such uninhabited or uninhabitable stretches of land as may lie within their mainland boundaries." (Demographic Yearbook, UN, 1956, p. 24)

3. Arable land area. Refers to land planted to crops, land temporarily fallow, temporary meadows for moving or pasture, garden land, and area under fruit trees, vines, fruit-bearing shrubs, and rubber plantation.
Source: Yearbook of Food and Agricultural Statistics: Production, FAO.

4. Population density. Refers to population/national land area.
See variables 1 and 2.

5. Population/arable land. See variables 1 and 3.

6. Energy production. Includes the primary sources of energy: coal and lignite, crude petroleum, natural gas and hydro electricity. (Unit: metric tons of coal equivalent)
Source: World Energy Supplies, UN. Table 2.

7. Population X energy production. This product has been used in a field analysis of international relations as a measure of the military strength of a nation. (Quincy Wright, The Study of International Relations, 1955, p. 599.) See variables 1 and 6 for definitions, year, and sources of the population and energy production data, respectively.

8. Energy production/population. See variables 1 and 6.

9. Gross national product. "Total value of goods and services produced in a country in a year's time . . . " Most of the data employed were acquired from the International Cooperation Administration as reported in a U.S. Senate Foreign Relations Committee working paper prepared by the Research Center in Economic Development and Cultural Change of the

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*This list is largely based upon The Dimensionality of Nations Project, "Variable Definitions, Data Sources, and Year," 1964. Miscellaneous sources consulted are not included in the list.

University of Chicago, The Role of Foreign Aid in the Development of Other Countries (Washington: Government Printing Office, 1957). (Norton Ginsburg, Atlas of Economic Development, 1961, p. 16) The data given on p. 16 of Ginsburg are generally for 1955. Additional source: Mikoto Usui and E. E. Hagen, World Income, 1957 (Cambridge, Mass., 1959).

10. Gross national product/population. See variables 1 and 9.

11. Manufacturing/GNP. Manufacturing includes production in factories; excludes mining, building and construction, and public utilities. (A System of National Accounts and Supporting Tables, U.N., Series F, 1957, Table 164, pp. 486-490; 1958, Table 162, pp. 432-436; 1959, Table 160, pp. 450-455.

12. Agricultural production/GNP. Agricultural includes agriculture, forestry, and fishing and is measured at factor cost. GNP is "gross domestic product at factor cost." Data cources: Statistical Yearbook, UN.

13. National income. "National income is the sum of the incomes accruing within a year to the factors of production supplied by the normal residents of a country, before deduction of direct taxation, and equals the sum of compensation of employees, income from unincorporated enterprises, rent, interest and dividends accruing to household saving of corporations, direct taxes on corporations and general government income." (Statistical Yearbook, U.N., 1959, p. 448). Data sources: Statistical Yearbook, U.N. Since national incomes are given in domestic currencies, exchange rate data vary in terms of their basis; many countries give data on several kinds of rates.

If available, data were chosen for only the free rate (a rate that rises or falls to some extent in response to private purchases and sales). If such data were not available, the following rates, in decreasing order of desirability, were used: selling or import rates, buying or export rates, official rate. Exchange rate data source: Statistical Yearbook, U.N.

14. Bloc membership. Rating: 0 = Communist bloc membership. 1 = neutral bloc, 2 = Western bloc. Communist and Western bloc membership is determined by military treaties or alliances with the Soviet Union or the United States. The neutral bloc is a residual category in which nations are categorized if they have no military treaties or alliances with either of the aforementioned bloc leaders. Source consulted: Statesman's Yearbook.

15. Freedom of opposition. Rating 0 = political opposition not permitted: groups not allowed to organize for political action (e.g., interest groups, political parties); 1 = restricted political opposition allowed (groups free to organize in politics, but oppositional role limited and

they may not campaign for control of government); 2 = political opposition mostly unrestricted (groups can organize for political action and may campaign for control of government). Sources consulted: Statesman's Yearbook, The Worldmark Encyclopedia of the Nations, 1960; Political Handbook and Atlas of the World, 1955 and 1956.

16. Legality of government change. Rating based on previous and present government: 0 = last and present government came into being through non-legal means (e.g., illegal elections, revolutions), or if there has been only one government since independence, present government came into being illegally; 1 = last or present government came into being through non-legal means, or if there has been only one government since independence, present government came into power legally; 2 = last and present government came into being through legal means. Government refers to the executive head of government; legality refers to the constitutional provisions for transferring power, or in the absence of a constitution, the traditional practice of a country (e.g., hereditary transference of power). Sources consulted: The Worldmark Encyclopedia of the Nations, 1960; Statesman's Yearbook, various years; Britanica Book of the Year, various years.

17. Voting system. Rating: 0 = no voting at all; 1 = plebiscite-type voting only, with single party and no effective primary; 2 = single party with effective primary; 3 = multi-party system with ban on extreme parties; 4 = multi-party system without limitation on parties. See variable 16 for sources consulted.

18. No. of political parties. Counted as given in Statesman's Yearbook, 1956, Political Handbook and Atlas of the World, 1956, and The Worldmark Encyclopedia of the Nations, 1960. Political parties with a membership less than 1% of the population were not counted.

19. Defense expenditure. Includes total current and capital outlays. Data are taken as given under the "defense" classification in the national account tables in the primary source: Statistical Yearbook, UN. Data generally are given in domestic currency. See variable 13 for definition and sources of exchange rate data used to convert domestic currencies to $ U.S. Other sources used for defense expenditure data were: Moody's Municipal and Government Manual, various years; Statesman's Yearbook, various years.

20. Defense expenditure/gross national product. See variables 19 and 9.

21. Newspaper circulation/population. "A daily newspaper is defined...as a publication containing general news and appearing at least four times a week...." and the data "represent the total daily circulation and refer to the number of copies sold both inside and outside the country" (Statistical Yearbook, UN, 1958, p. 572). The data are given per 1,000 people in the data sources: Statistical Yearbook, UN.

22. Telephones/population. Telephones include both public and private installations which can be connected to a central exchange. The data are given per 1,000 people. Sources: Statistical Yearbook, UN.

23. Radio receivers/population. Radio receivers refer to the "number of licenses issued or the estimated number of receivers (radio) in use" (Statistical Yearbook, UN, 1957, p. 641). The data are given per 1,000 people.

24. Vehicles/population. Vehicles include motor vehicles such as passenger cars, buses, and trucks but exclude motorcycles and government-owned vehicles. The data are given per 1,000 people. Sources: Statistical Yearbook, UN; The Worldmark Encyclopedia of the Nations.

25. Railroad length. Route miles of heavy railroads of various gauges. Excludes light railways, steam tramways, underground railroads, and urban electric lines. Source: Jane's World Railways (N.Y.: McGraw-Hill)

26. Population/physicians. Physicians refer to registered medical practitioners including doctors trained in Western medicine and herb doctors. Source: The Worldmark Encyclopedia of the Nations.

27. Religions. Number of religions with membership exceeding 1% of the population. Christianity is divided into Protestant and Catholic, but otherwise divisions are between major religions (Islam, Hindu, Buddhist, etc.) reported for a country. Sources: Demographic Yearbook, UN; The Worldmark Encyclopedia of the Nations.

28. Membership of largest religion/population. See variable 1 and 27. For purposes of calculating ratio, the latter is taken from the same census as that for religions.

29. Buddhists/population. See variables 1 and 27.

30. Mohammedans/population. See variables 1 and 27.

31. Roman Catholics/population. See variables 1 and 27. For an additional source, see The Catholic Encyclopedia, Supplement II.

32. Protestants/population. See variables 1 and 27. For an additional source, see The Catholic Encyclopedia, Supplement II.

33. Languages. Number of languages with membership exceeding 1% of the population. Refers to the "'mother tongue', that is, the language spoken by the individual, or in his home, in his early childhood." (Demographic Yearbook, UN, 1956, p. 34). Sources: Demographic Yearbook, UN; The Worldmark Encyclopedia of the Nations.

34. Membership of largest language group/population. See variables 1 and 33. For purposes of calculating the ratio, the latter is taken from the same census as that for languages.

35. Ethnic groups. Number of ethnic or racial groups with membership exceeding 1% of the population. Data are taken as reported by nations according to what they consider their major ethnic or racial divisions. Sources: Demographic Yearbook, UN; The Worldmark Encyclopedia of Nations.

36. Membership of largest ethnic group/population. See variables 1 and 35. For purposes of calculating ratio, the latter is taken from the same census as that for ethnic groups.

37. Embassies and legatons in other nations in the world. Number of embassies and legations in other countries as listed in the Statesman's Yearbook, The Diplomatic Yearbook,

38. Embassies and legations in other nations in Asia. See variable 37.

39. Embassies and legations from other nations in the world. See variable 37.

40. Embassies and legations from other nations in Asia. See variable 37.

41. Intergovernmental international organizations of which a member (Global IGO). Number of IGO's counted as categorized in the source: Yearbook of International Organizations, Union of International Associations.

42. Asian intergovernmental international organizations of which a member (Asian IGO). See variable 41.

43. Private international organizations of which a member (Global NGO). See variable 41.

44. Asian private international organizations of which a member (Asian NGO). See variable 41.

45. Exports (Global). Total exports to the countries in the world. Sources: Statistical Yearbook, UN; Yearbook of International Trade Statistics; The Worldmark Encyclopedia of the Nations.

46. Exports (Asian). Total exports to the countries in Asia. See variable 45. Additional source: Alexander Eckstein, Walter Galenson, and Ta-Chung Liu eds., Economic Trends in Communist China, Chicago: Aldine, 1968.

47. Imports (Global). Total imports from the countries in the world. See variable 45.

48. Imports (Asian). Total imports from the countries in Asia. See variable 46.