Philippine Review of Economics & Business
Vol. XXI, Nos. 1 & 2, March & June 1984

SOCIETY, POLITICS, AND ECONOMIC DEVELOPMENT: SOME EXPLORATORY NOTES

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This paper attempts to undertake a further discussion of the dynamics of social, political, and economic development. The author believes that there exist broad but well-specified theories of social, political, and economic development, one of which is Marxism which permits formulation of broad but empirically testable hypotheses. The paper presents some empirical hypotheses deducible from the Marxist theory of social change, which are subsequently tested using the same set of data used by Adelman and Morris (1967). Basically, the results demonstrate that the Marxist proposition about social change can be subjected to standard empirical tests, and provide empirical support to two fundamental Marxist propositions, namely that the rate of social and economic development increases upon attaining some thresholds in the development of capitalist forces in society and that imperialism, specified in some manner, is a significant factor in economic development.

1. Introduction

Since the appearance of *Society, Politics and Economic Development: A Quantitative Approach* by Irma Adelman and Cynthia Taft Morris in 1967, nothing as ambitious has been attempted by economists to show the dynamics of social, political, and economic development. A short note[1] was added to the discussion in 1981, but this did not result in any significant advance. The present paper is an attempt to advance the discussion somewhat. Contrary to the position taken by Adelman and Morris (A & M) (1967, p. 133), this writer believes that sufficiently broad but well specified theories of social, political and economic development have been put forward. For example, Marxism is specified well enough to permit formulation of broad but empirically testable hypotheses.

This exploratory paper has two basic results. At the methodo-

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[1] Tekiner, Ahmet C., "Social and Political Components of Economic Performance for the 1960s: A Note on Adelman and Morris," *Society, Politics and Economic Development, Journal of Development Economics* 8 (1981), pp. 249-258.

logical level, it demonstrates that Marxist propositions about social change can be subjected to standard empirical tests. At the substantive level, this paper provides empirical support to two fundamental Marxist propositions: (1) the rate of social and economic development increases upon the attainment of some thresholds in the development of capitalist forces in society; and (2) imperialism, specified in some manner, is a significant factor in economic development. The support given to these propositions is primarily qualitative, but quantitative estimates of the relationships implied by these propositions are part of the results.

The present paper is therefore organized in the following manner. The next section presents a theoretical framework implicit in, or which seems to be required to fully appreciate the results of the factor analytic approach of A & M. This is followed by a presentation of the empirical results of A & M and Tekiner in the third section. The fourth section presents some empirical hypotheses deducible from the Marxist theory of social change, together with the empirical method to test them. The fifth section presents some empirical results and the last one gives a summary of and tentative conclusions from our results.

2. A Factor-Analytic Framework

We may postulate as a general rule that any society can be described (or specified) exhaustively at any given time, by a vector of economic, political, social, and other variables, both endogenous and exogenous to the society in question. History, insofar as it is relevant, is specified by a series of such a vector of variables that is subscripted by time. We may further suppose that the values that these variables will take at any given time, insofar as these are not exogenous or predetermined in some sense, are determined by their mutual interaction, just as this mutual interaction is affected by the presence of exogenous and other predetermined variables. It is taken as axiomatic that the character of such mutual interaction is in the end due to the interaction of human actors, i.e., the values that all the endogenous variables will take at any time are the resultant of purposive human actions.

To formalize the preceding idea, let us specify the following model under the assumption of linearity of structural equations. Let Y_t = the vector of endogenous variables (social, political, economic, cultural, etc.) at time t; X_t = the vector of variables exogenous to society at time t; and P_t = vector of variables which are predeter-

mined at time t for the society under consideration, but endogenous to society in some sense. The latter calls for some explanation.

When we model the whole society under the assumption that human action is purposive, then the only truly exogenous variables which have any bearing on developments within that society are those whose values are yielded by history as well as those determined from outside that society itself. Examples of such exogenous variables are resource endowments, the amount of rainfall, and the external social, political, and economic environment. The vector X_t will therefore include, in general, past values of Y, in addition to the other exogenous variables mentioned above.

The vector of variables P_t is predetermined, i.e., the variables composing P_t are exogenous to society in the following sense. Assuming that all human action is purposive, we may suppose that all of the variables composing Y_t, or a subset of all such variables, may be taken as choice variables. This means to say that for such variables considered as choice variables, either society has desired targets for each of them contingent on the X_t, or some social welfare function can be specified, with such variables as arguments of this function, which society aims to maximize given X. The attainment of desired targets, or the maximization of the welfare function, entails choosing the values of certain variables that can be specified at will. These are the variables composing the vector P_t, and it is in the preceding sense that they are considered predetermined. But P_t can be considered endogenous too, in which case the only relevant vectors should be Y and X. If we take the latter course, we will have to break down Y into appropriate classes of variables just the same so it appears simpler to proceed with the specification such that Y_t, X_t and P_t are defined as above.

Under assumptions of linearity in the structural equations (and omitting random components for simplicity of presentation) the social system can be represented by

$$(1) \qquad AY_t = BX_t + CP_t$$

Assuming that there are n endogenous variables, m exogenous variables, and q policy variables, then A, B and C are $n \times n$, $n \times m$ and $n \times q$ matrices of coefficients, respectively. Since X_t *and* P_t are predetermined, then the vector Y_t can be solved for. But the mechanism could be something like the following.

Let Y_t^* be the vector of choice endogenous variables, where

Y_t^* is a q-vector, $q \leqslant n$, i.e., the number of choice variables is smaller than or equal to the number of endogenous variables and there are as many policy instruments as the number of choice variables. Let Y_t^- be the vector of non-choice endogenous variables, so that Y_t^- is an n-q vector. A subsystem is thus defined for society. This subsystem is given by

$$(2) \qquad A^* Y_t^* + A^- Y_t^- = B^* X_t + C^* P_t$$

where A^*, A^-, B^*, and C^* are matrices of coefficients of dimensions $q \times q$, $q \times n$-q, $q \times m$, and q x q, respectively, all of which are sub-matrices of the matrices of coefficients A, B, and C of equation (1). The problem posed by equation (2) is that of solving for P_t given target values for Y_t^*.

For simplicity, let us suppose that the target values for Y_t^* are set equal to $Y_{t-1}^* + \Delta Y_t^*$ Under the assumption that X_t includes past values of Y, we may specify Y_t^* equivalently as

$$(3) \qquad Y_t^* = X_t^* + \Delta X_t^*$$

to show that Y_t^* is now completely predetermined. Hence, from (2) and (3) above, we may solve for P_t, assuming that C* is not singular:

$$(4) \quad P_t = C^{*-1} [A^* (X_t^* + \Delta X_t^*) + A^- Y_t^- - B^* X_t]$$

$$= C^{*-1} A^* X_t^* + C^{*-1} A^* \Delta X_t^* + C^{*-1} A^- Y_t^- - C^{*-1} B^* X_t$$

$$= \overline{B} X_t + D \Delta X_t^* + A^- Y_t^-$$

where the terms $C^{*-1} A^* X_t^* - C^{*-1} B^* X_t$ are consolidated into $\overline{B} X_t$ since X_t^* is a sub-vector of X_t with $\overline{B}$ being a properly augmented $q \times m$ matrix and $D = C^{*-1} A^*$ and $\overline{A} = -C^{*-1} A^-$. In effect, equation (4) is the policy rule for the system. The endogeneity of policy instruments is highlighted by this equation. Moreover, it clearly shows that the values policy instruments take respond to the values of endogenous variables not specifically taken into account as choice variables. The non-singularity of C^* can be taken for granted since the non-existence of a solution to (4) can be taken care of in society by a different choice of policy instruments so that a solution exists.

In any event, from equations (1) and (4) we may work up the solution for Y_t:

$$(1') \qquad AY_t = BX_t + C(\bar{B}X_t + D\,\Delta X_t^* + \bar{A}\ Y_t)$$

$$= BX_t + C\bar{B}X_t + CD\,\Delta X_t^* + C\bar{A}\ Y_t^-$$

Since Y_t^- is a subvector of Y_t, nothing is lost if we take the n-q vector, Y^- as made up of the last n-q component of the n-vector Y_t. If so, we can express equation (1') as

$$(1'') \qquad \hat{A}\ Y_t = (CB + C\bar{B})\,X_t + CD\,\Delta X_t^*$$

where

$$(6) \qquad \hat{A} = [A] - [O : C\bar{A}]$$

where the first matrix A on the right-hand side of equation (6) is $n \times n$ and the second matrix is also $n \times n$ with partitions O and $C\bar{A}$ where O is $n \times q$ matrix of zeros and $C\bar{A}$ is an $n \times (n\text{-}q)$ matrix of coefficients. From equations (1") and (6), the solution for Y_t is given by:

$$(7) \qquad Y_t = \hat{A}^{-1}\ (B + C\bar{B})\,X_t + \hat{A}^{-1}\ CD\,\Delta X_t^*$$

Equation (7) shows, under the linearity assumptions that we have made, that the values that endogenous social, political, economic, cultural and other societal variables will take at any time are linear functions of the exogenous variables X_t and other predetermined variables ΔX_t^* impinging on society at time t. We may in fact suppose that the vector of desired increments to the choice variables given by ΔX_t^* can be expressed as linear combinations of X_t. The reason for this is that X_t encompasses the economic structure, class positions and strengths, etc. It stands to reason that the socially desired increments to a choice variable will be determined by class interests as well as by other exogenously given variables. If we take this simplification, we may now express Y_t simply as a linear combination of X_t:

$$(8) \qquad Y_t = A^{**} X_t$$

where A^{**} is an appropriate $n \times m$ matrix of coefficients.

We can see from equation (8) that the endogenous variables forming the vector Y_t observed over some period $t = 0$ to $t = T$ will

in general be intercorrelated. A & M in their work cited above observed this intercorrelation among the *Y*s. However, they did not have any theory in mind to test, so that what they did was to factor analyze the *Y*s to see what factors could possibly account for this intercorrelation. The usefulness of such an approach can easily be seen.

Suppose equation (8) holds for society. It follows that the variance of any of the endogenous variables, Y, for instance, can be accounted for completely by the variances and covariances of the *X*s, given the parameters of the system summarized in A^{**}. Now suppose it is possible to specify a vector of factors F_t of dimension $k \times 1$ at t, any t, such that

$$Y_t = B^{**} F_t \tag{9}$$

where B^{**} is an $n \times k$ vector of coefficients, and $k < m$. If equation (9) also holds, then the variance of Y_i, say, can be accounted for completely by the variances and covariances of the *F*s. If we measure the *Y*s and the *F*s in standard units, and so choose the *F*s to be orthogonal, then a representative equation of (9) would be

$$Y_{it} = \sum_{j=1}^{k} b_{ij}^{**} F_{jt} \tag{10}$$

and the variance of Y_i, equal to $\sum_{j=1}^{k} (b_{ij}^{**})^2$ will be equal to unity, and equal also to R^2 for the regression of Y_i on the *F*s.

It might be too much to expect to find an F_t and a corresponding B^{**} for equation (9) to hold exactly. Nevertheless, it might yet be possible to find an $\overline{F}_t$ of dimension r and no more, satisfying the condition that the *F*s are orthogonal, such that

$$Y_t = \overline{B}^{**} \overline{F}_t + R\,U \tag{11}$$

where R is a diagonal matrix of coefficients and U is an n-vector of so-called unique factors determining each of the *Y*s. At the limit, $\overline{F}_t$ could have dimension m so the $\overline{F}_t = X_t$ and $U = 0$.

Factor analysis is a statistical technique whose aims are to identify the *F*s *composing* $\overline{F}_t$ in equation (11) and to estimate $\overline{B}^{**}$, called the matrix of factor loadings. The approach is all the more

powerful as the dimension of $\overline{F}_t$ is smaller, and the closer is $\sum_{j=1}^{r} (\bar{b}^{**}_{ij})^2$ to unity for all i. The latter condition implies that the variances of the endogenous variables are accounted for primarily by the common factors F_t. Thus, factor analysis is potentially a powerful technique for it allows reduction of a complex model such as that represented by equation (8) into something more manageable. Indeed, the variables X_t may not be known completely but factor analysis may allow identification of what the factors F may represent, whether they represent economic, political, social, or other variables. In other words, to the extent that the social mechanism that determines the values of relevant social, political, economic and other variables can be represented by a model that culminates in equation (8), then factor analysis of these variables seems to permit economy in "explanation" in the sense that the vector X_t is represented by a vector of the smallest dimension possible. But factor analysis may have some rather serious limitations. It is easier to understand all of these when we see the results of the technique as applied by A & M and Tekiner.

3. Society, Politics and Economic Development According to A & M and Tekiner

Adelman and Morris factor analyzed different combinations of 41 social, political and economic variables (Table 1) for a sample of 74 developing countries. The results for the "implicitly historical analysis" are reproduced below as Tables 2-8. Table 2 is the matrix of factor loadings for 24 social and political variables plus per capita GNP for the 74 less developed countries. The next tables show the same kind of matrix for three different subsamples based on regional criteria (Tables 3-5) and on three different subsamples based on level of socioeconomic development (Tables 6-8). We will not go into a detailed interpretation of these results. It would suffice, for our purposes, to reproduce A & M's summary of their discussions related to Tables 2-5. On pages 171-2, we have:

> . . . The nature of the systematic relationship between income per capita and various indicators of social and political structure was explored. In particular, an association was derived between per capita GNP and two aspects of sociopolitical change: the sociocultural concomitants of the industrialization-urbanization process (Factor I) and the evolution of participant political institutions (Factor II). The relationship expressed in Factor I indicates a strong

Table 1 — List of Social, Political, and Economic Variables

1. Size of the Traditional Agricultural Sector
2. Extent of Dualism
3. Extent of Urbanization
4. Character of Basic Social Organization
5. Importance of the Indigenous Middle Class
6. Extent of Social Mobility
7. Extent of Literacy
8. Extent of Mass Communication
9. Degree of Cultural and Ethnic Homogeneity
10. Degree of Social Tension
11. Crude Fertility Rate
12. Degree of Modernization of Outlook
13. Degree of National Integration and Sense of National Unity
14. Extent of Centralization of Political Power
15. Strength of Democratic Institutions
16. Degree of Freedom of Political Opposition and Press
17. Degree of Competitiveness of Political Parties
18. Predominant Basis of the Political Party System
19. Strength of the Labor Movement
20. Political Strength of the Traditional Elite
21. Political Strength of the Military
22. Degree of Administrative Efficiency
23. Extent of Leadership Commitment to Economic Development
24. Extent of Political Stability
25. Per Capita GNP in 1961
26. Rate of Growth of Real per Capita GNP: 1950/51-1963/64
27. Abundance of Natural Resources
28. Gross Investment Rate
29. Level of Modernization of Industry
30. Change in Degree of Industrialization since 1950
31. Character of Agricultural Organization
32. Level of Modernization of Techniques in Agriculture
33. Degree of Improvement in Agricultural Productivity since 1950
34. Level of Adequacy of Physical Overhead Capital
35. Degree of Improvement in Physical Overhead Capital since 1950
36. Level of Effectiveness of the Tax System
37. Degree of Improvement in the Tax System since 1950
38. Level of Effectiveness of Financial Institutions
39. Degree of Improvement in Financial Institutions since 1950
40. Rate of Improvement in Human Resources
41. Structure of Foreign Trade

Source: List of Variables, pp. 16-17 of A & M.

tendency for levels of economic development to be positively correlated with the extent of functional differentiation and integration of diverse social units. A similarly significant positive association is evident in Factor II between income levels and the degree of articulation and integration of political systems. In contrast, a rather weak relationship appears between broad levels of development and indicators summarizing the character of leadership and the degree of social and political stability in the past decade (Factors III and IV) . . . The results of the regional studies support the findings of the over-all analysis. In addition, they indicate that the role of the social aspects of the industrialization-urbanization process is overwhelmingly important for low income economies in which the absorptive capacity is sharply limited by the inhibiting nature of the social structure. As the barriers to industrialization imposed by the social institutions become weaker, the importance of the forces summarized in Factor I tends to decline. However, even among countries at higher stages of development, the social variables remain the most important element associated with intercountry differences in per capita GNP . . . Another feature of the regional analyses is the systematic pattern of variation in the significance of the factor representing the development of representative political systems. At the early stages, Factor II is of negligible importance; it assumes increasing relevance as social institutions become more adaptable to the requirements of economic growth. This association between more democratic and better articulated and integrated political systems, on the one hand, and levels of economic development, on the other, probably arises because both the ability to generate sustained economic growth and the evolution of more sophisticated political institutions require fundamental changes in mentality characteristic of the spread of rational thought patterns. The participant style of life tends to generate a capacity to adapt existing institutional frameworks to continual economic and social change. This malleability of social structure is essential both to successful entrepreneurial activity and to effective political modernization . . . In interpreting the results of this chapter, it is important to bear in mind that, as pointed out in Chapter III, the relationships found between levels of economic development and differences in social and political structure are neither caused nor causal. Rather they reflect the interaction of an organic system of institutional and

> behavioral change which underlies the process of economic development. As emphasized earlier by one of the authors, "The phenomenon of underdevelopment must be understood . . . in the context of the entire complex of interrelationships that characterize the economic and social life of the community." . . . The degree of intimate interrelationship found in this analysis between the economic and noneconomic concomitants of a country's historical evolution is rather surprising. It lends support to the views long held by development economists that, in the last analysis, the purely economic performance of a community is strongly conditioned by the social and political setting in which economic activity takes place and that the less developed a nation is, the less powerful is economic policy alone in inducing economic development. It would appear that the splitting off of homo economicus into a separate analytic entity, a common procedure since Adam Smith in theorizing about growth in advanced economies, is much less suited to countries that have not yet made the transition to self-sustained economic growth."

It is standard practice in factor analysis to identify factors with processes which derive their meaning from the variables (that are being factor analyzed) which have high factor loadings on these factors. Hence, factor 1 above refers to "the sociocultural concomitants of the industrialization-urbanization process" or, in another passage from A & M, it "may be interpreted to represent the process of change in attitudes and institutions associated with the breakdown of traditional social organization." The reason is quite obvious: variables which indicate urbanization, or changes in attitudes and institutions accompanying industrialization, have the highest loadings on this factor. Strictly speaking, the most that can be said, given the results summarized in Table 2 for instance, is that underlying processes or causal factors which have large and significant effect on urbanization, increased importance of the indigenous middle class, and other such variables, also bring about large and significant effects on per capita income. Similar statements can be made in connection with the other factors.

A more significant result of the A & M study is that factor loadings on the different factors change as we move from one subsample to another. In fact some socioeconomic and political variables shift position in the sense that the highest loading for any one variable shifts from factor 1, say, to factor 2 or 3. Such shifting is even more pronounced for subsamples defined in terms of level of socioecono-

Table 2 — Rotated Factor Matrix for Per Capita GNP Together with Twenty-four Social and Political Variables[a] (Seventy-four Less-Developed Countries)

Political and Social Indicators	Rotated Factor Loadings				
	F_1	F_2	F_3	F_4	(R^2)
Per Capita GNP in 1961	−.73	.31	−.26	−.03	.699
Size of the Traditional Agricultural Sector	.89	−.21	.17	−.08	.869
Extent of Dualism	−.84	.14	−.30	.04	.824
Extent of Urbanization	−.84	.13	−.12	.02	.741
Character of Basic Social Organization	−.83	.24	.10	.03	.761
Importance of the Indigenous Middle Class	−.82	.14	−.23	−.08	.755
Extent of Social Mobility	−.86	.21	−.18	−.18	.848
Extent of Literacy	−.86	.32	.03	−.11	.845
Extent of Mass Communication	−.88	.28	−.06	−.02	.858
Degree of Cultural and Ethnic Homogeneity	−.66	−.30	.34	−.21	.680
Degree of National Integration and Sense of National Unity	−.87	−.07	.01	−.18	.792
Crude Fertility Rate	.63	−.14	.05	.18	.448
Degree of Modernization of Outlook	−.75	.31	−.39	−.03	.805
Strength of Democratic Institutions	−.48	.72	−.26	−.19	.857
Degree of Freedom of Political Opposition and Press	−.33	.82	−.02	−.10	.802
Degree of Competitiveness of Political Parties	−.32	.79	.08	.25	.801
Predominant Basis of the Political Party System	−.43	.70	.04	.01	.681
Strength of the Labor Movement	−.38	.63	−.36	−.05	.678
Political Strength of the Military	−.26	−.58	.36	.41	.706
Extent of Centralization of Political Power	−.07	−.65	.08	−.02	.432
Political Strength of the Traditional Elite	.08	−.07	.73	.05	.543
Extent of Leadership Commitment to Economic Development	−.14	−.02	−.80	−.21	.699
Degree of Administrative Efficiency	−.39	.37	−.59	−.16	.663
Degree of Social Tension	.22	.02	.02	.87	.816
Extent of Political Stability	−.07	.05	−.39	−.82	.821

[a]Bold figures indicate the factor to which each variable is assigned. Variables omitted because of insignificant correlations: none. Variables omitted because of low high loadings: none. Percentage of overall variance explained by factors: 73.7. Percentage of variance explained by last factor included: 5.0.

Source: Table IV-1, p. 151 of A & M.

Table 3 — Rotated Factor Matrix for Per Capita GNP Together with Twenty-four Social and Political Variables[a] (27 African Countries)

Political and Social Indicators	Rotated Factor Loadings				
	F_1	F_2	F_3	F_4	(R^2)
Per Capital GNP in 1961	−.81	−.01	.20	.25	.754
Size of the Traditional Agricultural Sector	.85	−.10	−.01	−.04	.733
Extent of Dualism	−.88	.09	.02	.08	.781
Extent of Urbanization	−.75	.11	.17	.35	.724
Character of Basic Social Organization	−.63	.18	−.23	.10	.491
Extent of Social Mobility	−.64	.04	−.67	.02	.854
Extent of Literacy	−.75	.31	.05	.07	.665
Extent of Mass Communication	−.64	.20	−.02	.54	.739
Degree of Modernization of Outlook	−.91	.09	.04	−.05	.834
Degree of Administrative Efficiency	−.56	.40	−.21	−.14	.537
Strength of Democratic Institutions	−.25	.83	.01	.02	.750
Degree of Freedom of Political Opposition and Press	.13	.88	.02	.07	.803
Degree of Competitiveness of Political Parties	−.37	.83	.19	−.20	.900
Predominant Basis of the Political Party System	−.05	.74	.26	−.02	.614
Strength of the Labor Movement	−.33	.71	−.08	−.09	.631
Degree of Social Tension	−.48	.11	.64	−.27	.732
Extent of Political Stability	.22	−.28	−.67	.17	.601
Political Strength of the Military	−.46	−.33	.54	.10	.623
Political Strength of the Traditional Elite	−.12	.04	.62	.24	.457
Extent of Leadership Commitment to Economic Development	−.45	−.23	−.62	−.08	.649
Importance of the Indigenous Middle Class	−.33	−.01	−.62	−.02	.495
Degree of Cultural and Ethnic Homogeneity	.04	.00	−.09	.84	.714
Degree of National Integration and Sense of National Unity	−.23	−.17	−.19	.79	.741
Extent of Centralization of Political Power	−.27	−.28	.31	.48	.485
Crude Fertility Rate	.06	−.05	−.33	−.72	.637

[a]Bold figures indicate the factor to which each variable is assigned. Variables omitted because of insignificant correlations: none. Variables omitted because of low high loadings: none. Percentage of overall variance explained by factors: 67.8. Percentage of variance explained by last factor included: 8.6.

[b]A variable having loadings on two factors which are not significantly different is assigned to that factor to which it is judged to have the closest affinity.

Source: Table IV-2, p. 160 of A & M.

Table 4 — Rotated Factor Matrix for Per Capita GNP Together with Twenty-four Social and Political Variables[a] (Twenty-six Near Eastern and Far Eastern Countries)

Political and Social Indicators	Rotated Factor Loadings				
	F_1	F_2	F_3	F_4	(R^2)
Per Capita GNP in 1961	−.58	−.55	−.12	−.09	.672
Size of the Traditional Agricultural Sector	.82	.47	.13	.15	.941
Extent of Dualism	−.87	−.35	−.18	−.12	.924
Extent of Urbanization	−.76	−.14	−.33	−.19	.742
Character of Basic Social Organization	−.65	−.19	−.07	−.57	.782
Importance of the Indigenous Middle Class	−.83	−.33	−.15	−.13	.838
Extent of Social Mobility	−.87	−.20	−.15	−.25	.880
Extent of Literacy	−.63	−.24	−.22	−.44	.689
Extent of Mass Communication	−.84	−.31	−.04	−.26	.879
Degree of National Integration and Sense of National Unity	−.81	.21	−.33	−.06	.814
Degree of Cultural and Ethnic Homogeneity	−.63	.49	−.01	.27	.706
Degree of Modernization of Outlook	−.58	−.42	−.51	−.34	.891
Political Strength of the Traditional Elite	.71	.17	.06	.19	.579
Degree of Administrative Efficiency	−.63	−.24	−.53	−.37	.883
Strength of Democratic Institutions	−.33	−.65	−.30	−.51	.892
Degree of Freedom of Political Opposition and Press	−.37	−.65	−.04	−.60	.921
Strength of the Labor Movement	−.38	−.69	−.12	−.28	.717
Political Strength of the Military	.08	.82	.13	.28	.784
Crude Fertility Rate	.49	.72	.25	.10	.839
Extent of Leadership Commitment to Economic Development	−.18	−.28	−.76	.04	.683
Extent of Political Stability	−.09	−.27	−.92	.02	.933
Degree of Social Tension	.20	−.15	.84	−.01	.772
Predominant Basis of the Political Party System	−.30	−.16	−.23	−.81	.830
Degree of Competitiveness of Political Party System	−.30	−.15	.10	−.88	.895
Extent of Centralization of Political Power	−.10	.34	−.20	.69	.632

[a]Bold figures indicate the factor to which each variable is assigned. Variables omitted because of insignificant correlations: none. Variables omitted because of low high loadings: none. Percentage of overall variance explained by factors: 80.5. Percentage of variance explained by last factor included: 5.2.

Source: Table IV-3, p. 161 of A & M.

Table 5 — Rotated Factor Matrix for Per Capita Income Together with Twenty-four Social and Political Variables[a] (21 Latin American Countries)

Political and Social Indicators	Rotated Factor Loadings				
	F_1	F_2	F_3	F_4	(R^2)
Per Capita GNP in 1961	−.58	.44	−.32	.22	.675
Size of the Traditional Agricultural Sector	**.90**	−.27	.07	−.03	.882
Extent of Dualism	−.77	.24	−.11	.39	.809
Character of Basic Social Organization	−.67	.49	.41	.11	.794
Importance of the Indigenous Middle Class	−.66	.09	−.30	.31	.632
Extent of Social Mobility	−.56	.41	−.26	.54	.841
Extent of Literacy	−.62[b]	.00	−.28	.62	.840
Extent of Mass Communication	−.57	.16	−.55	.33	.753
Degree of Cultural and Ethnic Homogeneity	−.84	−.24	.04	.01	.759
Degree of National Integration and Sense of National Unity	−.83	.21	−.22	.05	.779
Crude Fertility Rate	.66	−.11	.14	−.23	.518
Degree of Modernization of Outlook	−.64	.64	−.02	.25	.883
Strength of Democratic Institutions	−.38	.53	−.36	.51	.820
Predominant Basis of the Political Party System	−.15	.62	−.50	−.27	.725
Extent of Centralization of Political Power	.12	−.67	.47	.09	.686
Strength of the Labor Movement	−.33	.79	−.06	.16	.766
Political Strength of the Military	−.07	−.57	.33	−.53	.722
Extent of Leadership Commitment to Economic Development	−.07	.80	−.13	.16	.686
Degree of Administrative Efficiency	−.52	.52	−.37	.48	.896
Political Strength of the Traditional Elite	.02	−.79	−.21	−.37	.803
Degree of Freedom of Political Opposition and Press	−.37	.22	−.68	.21	.692
Degree of Competitiveness of Political Parties	.00	.00	−.81	−.13	.670
Extent of Urbanization	−.20	.36	−.51	.25	.492
Degree of Social Tension	.15	−.07	−.26	−.75	.657
Extent of Political Stability	−.33	.26	−.09	.72	.704

[a]Bold figures indicate the factor to which each variable is assigned. Variables omitted because of insignificant correlations: none. Variables omitted because of low high loadings: none. Percentage of overall variance explained by factors: 74.0. Percentage of variance explained by last factor included: 6.2.

[b]A variable having loadings on two factors which are not significantly different is assigned to that factor to which it is judged to have the closest affinity.

Source: Table IV-4, p. 162 of A & M.

mic development (Tables 6-8). If we consider the factor-analytic result for countries at low levels of socioeconomic development (Table 6), the underlying processes, or causal factors that bring about significantly large effects on dualism, mass communication, urbanization, industrial modernization, less trade concentration, abundance of natural resources and physical overhead capital, also have significantly large effects on per capita income. It appears that processes that have large impacts on human resource improvements or on the gross investment rate or the character of social organization have less impact on per capita income.

In the case of the intermediate sample, however, processes that bring about significant increases in the gross investment rate also bring about large changes in per capita income (Table 7). This is an exact opposite of the low sample results. Moreover, processes that bring about significant effects on the abundance of natural resources or on trade concentration have less significant effects on per capita income, in contrast to large effects on per capita income for the low sample.

As we move on to the sample of most developed countries among the LDCs (Table 8), underlying processes that brought about significant impact on political variables, also brought about significant impact on dualism, social mobility, etc., and per capita income. In the previous samples, processes that brought about significant changes in political variables hardly affected per capita income.

All these changes have interesting stories to tell, depending on which variable is being considered, and all of these stories seem consistent with each other and with what seems to be currently understood about the development process.

Consider the variable "Importance of the Indigenous Middle Class" measured primarily by the percentage of the male labor force engaged in commerce, banking, insurance, or in technical, professional, managerial, administrative, or clerical employments, adjusted for the importance of expatriate elements. Looking at Table 6, we see that the social process that increases the importance of the indigenous middle class has some slight positive effect on per capita income. But in Table 7 which corresponds to countries at the intermediate stage of socioeconomic development, an increase in the importance of the middle class even brings down per capita income. And yet, for countries which have reached the highest stage of socioeconomic development (which, for the LDCs consists of countries definitely on the take-off), the social processes that increase

Table 6 — Rotated Factor Matrix for Per Capita GNP in 1961 Together with Thirty-five Political, Social, and Economic Variables[a] (Low Sample)

Political, Social, and Economic Indicators	Rotated Factor Loadings					
	F_1	F_2	F_3	F_4	F_5	(R^2)
Per Capita GNP in 1961	.12	.16	−.85	.07	.07	.782
Importance of the Indigenous Middle Class	.76	−.35	.00	.00	.18	.734
Extent of Social Mobility	.58	−.51	−.12	−.03	.21	.656
Degree of Modernization of Outlook	.58	−.22	−.27	−.23	.46	.724
Level of Effectiveness of Financial Institutions	.73	−.08	−.37	−.30	.11	.774
Level of Effectiveness of the Tax System	.73	−.33	−.23	−.02	−.04	.690
Level of Modernization of Techniques in Agriculture	.49	−.48	−.15	−.22	−.26	.609
Character of Agricultural Organization	.52	−.10	−.23	−.04	.14	.356
Degree of Improvement in Financial Institutions since 1950	.74	.27	−.32	.10	−.16	.756
Degree of Improvement in the Tax System since 1950	.67	−.16	−.32	.31	−.31	.768
Change in Degree of Industrialization since 1950	.69	−.01	−.18	.03	−.17	.537
Degree of Improvement in Agricultural Productivity since 1950	.90	.03	.05	−.01	.06	.819
Strength of Democratic Institutions	.22	−.84	−.12	−.06	.02	.768
Degree of Freedom of Political Opposition and Press	.09	−.89	−.08	.10	.01	.811

Table 6 (Continued)

Political, Social, and Economic Indicators	Rotated Factor Loadings					
	F_1	F_2	F_3	F_4	F_5	(R^2)
Predominant Basis of the Political Party System	−.05	**−.76**	−.09	−.17	−.13	.630
Degree of Competitiveness of Political Parties	.10	**−.82**	−.10	−.43	.12	.888
Strength of the Labor Movement	.15	**−.74**	−.31	−.05	.25	.733
Political Strength of the Traditional Elite	−.22	**.56**	−.28	−.27	−.16	.540
Political Strength of the Military	.12	**66**	.19	−.43	−.29	.752
Degree of Administrative Efficiency	.46	**−.52**	−.18	−.17	.37	.680
Extent of Dualism	.62	−.15	**−.64**	−.06	.22	.867
Extent of Mass Communication	.10	−.27	**−.75**	.13	−.28	.747
Extent of Urbanization	.13	−.01	**−.64**	−.33	−.32	.630
Level of Modernization of Industry	.30	−.25	**−.77**	−.07	.00	.750
Structure of Foreign Trade	.18	−.22	**−.34**[b]	−.02	.33	.299
Abundance of Natural Resources	.08	−.22	**−.74**	.25	.15	.694
Level of Adequacy of Physical Overhead Capital	.33	−.28	**−.73**	−.18	−.16	.788
Extent of Political Stability	.12	.05	−.17	**.87**	.10	.807
Degree of Social Tension	.07	−.06	.06	**−.79**	.16	.670
Extent of Leadership Commitment to Economic Development	.54	−.13	.26	**.50**[c]	.16	.651
Extent of Literacy	.22	−.32	−.34	**−.46**	−.12	.459
Degree of National Integration and Sense of National Unity	.02	.13	−.14	−.05	**−.87**	.797
Degree of Cultural and Ethnic Homogeneity	−.14	.20	−.13	−.04	**−.73**	.607

Table 6 (Continued)

Political, Social and Economic Indicators	Rotated Factor Loadings					
	F_1	F_2	F_3	F_4	F_5	(R^2)
Rate of Improvement in Human Resources	.27	−.05	−.59	.10	**−.61**	.816
Character of Basic Social Organization	.20	−.10	−.06	−.51	**−.56**	.621
Gross Investment Rate	.19	.06	−.42	.02	**.54**	.502

[a]Bold figures indicate the factor to which each variable is assigned. Variable omitted because of insignificant correlations: extent of centralization of political power. Variables omitted because of low high loadings: degree of improvement in physical overhead capital since 1950, size of the traditional agricultural sector, and crude fertility rate. Percentage of overall variance explained by factors: 68.7. Percentage of variance explained by last factor included: 6.8.

[b]No exclusions for low high loadings have been made in this analysis other than those made in the parallel short-run analysis (Table V-1). See text for explanation.

[c]A variable having loadings on two factors which are not significantly different is assigned to that factor to which it is judged to have the closest affinity.

Source: Table V-5, pp. 200-1 of A & M.

Table 7 — Rotated Factor Matrix for Per Capita GNP in 1961 Together with Thirty-six Political, Social, and Economic Variables[a] (Intermediate Sample)

Political, Social, and Economic Indicators	Rotated Factor Loadings					
	F_1	F_2	F_3	F_4	F_5	(R^2)
Per Capita GNP in 1961	.79	−.08	−.14	−.01	−.19	.685
Size of the Traditional Agricultural Sector	−.60	.28	−.15	−.05	−.38	.603
Extent of Dualism	.64	.00	.11	−.35	.48	.784
Extent of Mass Communication	.66	−.36	.08	.10	−.43	.758
Gross Investment Rate	.53	.03	.00	−.07	−.09	.297
Level of Modernization of Industry	.59	−.04	−.52	−.27	.19	.723
Level of Modernization of Techniques in Agriculture	.81	−.23	.19	.11	.23	.807
Character of Agricultural Organization	.70	.13	.08	−.29	−.02	.589
Level of Effectiveness of the Tax System	.65	−.17	.01	.00	.15	.480
Level of Adequacy of Physical Overhead Capital	.79	.03	−.13	−.20	.26	.742
Strength of Democratic Institutions	.12	−.77	.04	−.46	.10	.834
Degree of Freedom of Political Opposition and Press	.22	−.79	.17	.07	.02	.709
Predominant Basis of the Political Party System	.02	−.86	−.19	.04	−.14	.788
Degree of Competitiveness of Political Parties	.34	−.86	−.12	.12	−.17	.908
Strength of the Labor Movement	.07	−.51	.03	−.27	−.42	.511
Degree of Centralization of Political Power	.15	.75	−.11	.10	−.12	.616

Table 7 (Continued)

Political, Social, and Economic Indicators	Rotated Factor Loadings					
	F_1	F_2	F_3	F_4	F_5	(R^2)
Extent of Literacy	.16	**−.56**	.52	.05	.14	.633
Character of Basic Social Organization	−.54	**−.57**	.24	.33	−.06	.797
Degree of Cultural and Ethnic Homogeneity	.07	**.55**	.19	.54	.09	.644
Degree of Social Tension	.13	.07	**−.67**	.32	.05	.580
Degree of National Integration and Sense of National Unity	.09	.40	**.53**	.49	−.05	.684
Importance of the Indigenous Middle Class	.02	.06	**.62**	−.01	.41	.555
Extent of Social Mobility	.33	−.02	**.81**	−.01	.13	.785
Abundance of Natural Resources	.33	.02	**−.69**	.09	−.36	.725
Extent of Political Stability	.05	−.04	.52	**−.79**	.11	.916
Extent of Leadership Commitment to Economic Development	.03	.18	.04	**−.84**	.04	.737
Degree of Modernization of Outlook	.37	−.50	−.10	**−.64**	−.05	.808
Degree of Administrative Efficiency	.47	−.13	.11	**−.70**	.20	.786
Political Strength of the Military	−.13	.35	−.32	**.53**	.26	.388
Structure of Foreign Trade	.24	.12	−.37	**−.50**	.36	.585
Change in Degree of Industrialization since 1950	.01	−.13	.28	.09	**.83**	.789

Table 7 (Continued)

Political, Social, and Economic Indicators	Rotated Factor Loadings					
	F_1	F_2	F_3	F_4	F_5	(R^2)
Level of Effectiveness of Financial Institutions	.55	.06	−.04	−.42	**.60**	.847
Degree of Improvement in Financial Institutions since 1950	.03	−.18	−.16	.08	**.83**	.754
Degree of Improvement in Physical Overhead Capital since 1950	.14	.20	−.40	−.15	**.49**	.482
Degree of Improvement in Agricultural Productivity since 1950	.28	.15	.22	−.21	**.75**	.754
Degree of Improvement in the Tax System since 1950	−.11	.19	.25	−.01	**.71**	615
Rate of Improvement in Human Resources	.25	.03	.51	−.25	**.61**	.753

[a]Bold figures indicate the factor to which each variable is assigned. Variables omitted because of insignificant correlations: crude fertility rate and political strength of the traditional elite. Variable omitted because of low high loading: extent of urbanization. Percentage of overall variance explained by factors: 69.3. Percentage of variance explained by last factor included: 7.7.

Source: Table VI-6, pp. 227-8 of A & M.

Table 8 — Rotated Factor Matrix for Per Capita GNP in 1961 Together with Thirty-six Political, Social, and Economic Variables[a] (High Sample)

Political, Social, and Economic Indicators	Rotated Factor Loadings				
	F_1	F_2	F_3	F_4	(R^2)
Per Capita GNP in 1961	−.82	.10	−.08	.28	.768
Size of the Traditional Agricultural Sector	.89	.12	−.14	−.13	.838
Extent of Dualism	−.88	.05	.15	−.25	.859
Importance of the Indigenous Middle Class	−.77	.24	.23	−.05	.715
Extent of Social Mobility	−.68	.30	.29	.18	.674
Extent of Literacy	−.61	−.16	.06	.27	.482
Extent of Mass Communication	−.74	.03	−.22	.27	.661
Degree of Modernization of Outlook	−.69	.20	.49	.06	.758
Crude Fertility Rate	.83	.11	−.02	.11	.720
Strength of Democratic Institutions	−.81	−.05	.15	.41	.845
Extent of Centralization of Political Power	.70	−.03	.01	−.62	.874
Strength of the Labor Movement	−.72	−.04	.23	.48	.811
Political Strength of the Military	.70	−.06	−.09	−.31	.597
Political Strength of the Traditional Elite	.48	−.39	−.33	.29	.571
Degree of Administrative Efficiency	−.58	.41	.55	.16	.835
Level of Modernization of Techniques in Agriculture	−.85	.26	.14	.00	.811
Character of Agricultural Organization	−.53	.36	.50	.16	.685
Level of Modernization of Industry	−.61	.37	.29	.32	.691
Level of Adequacy of Physical Overhead Capital	−.84	.23	.16	.06	.794

Table 8 (Continued)

Political, Social, and Economic Indicators	Rotated Factor Loadings				
	F_1	F_2	F_3	F_4	(R^2)
Rate of Improvement in Human Resources	−.57	.27	.09	−.11	.418
Extent of Leadership Commitment to Economic Development	−.31	.63	.36	.18	.656
Gross Investment Rate	−.46	.57	.06	.37	.673
Level of Effectiveness of the Tax System	−.45	.62	−.12	.19	.643
Level of Effectiveness of Financial Institutions	−.57	.55[b]	.25	.35	.819
Degree of Improvement in Agricultural Productivity since 1950	.07	.67	.29	.20	.572
Change in Degree of Industrialization since 1950	.22	.69	.30	.06	.612
Degree of Improvement in the Tax System since 1950	−.11	.71	−.28	−.20	.637
Degree of Improvement in Financial Institutions since 1950	−.02	.79	−.13	−.10	.658
Degree of Social Tension	−.03	.04	−.83	.01	.689
Extent of Political Stability	−.30	.14	.73	.10	.655
Degree of National Integration and Sense of National Unity	−.23	.14	.73	−.00	.615
Degree of Cultural and Ethnic Homogeneity	−.02	−.28	.53	−.36	.485
Degree of Freedom of Political Opposition and Press	−.66	.01	−.27	.62[b]	.892

Table 8 (Continued)

Political, Social, and Economic Indicators	Rotated Factor Loadings				
	F_1	F_2	F_3	F_4	(R^2)
Predominant Basis of Political Party System	−.23	.38	.26	**.67**	.722
Degree of Competitiveness of Political Parties	−.19	.15	−.42	**.55**	.536
Character of Basic Social Organization	−.35	−.41	.04	**.66**	.729
Abundance of Natural Resources	.12	.08	.02	**.71**	.526

[a]Bold figures indicate the factor to which each variable is assigned. Variables omitted because of insignificant correlations: degree of improvement in physical overhead capital since 1950 and structure of foreign trade. Variable omitted because of low high loading: extent of urbanization. Percentage of overall variance explained by factors: 69.0. Percentage of variance by last factor included: 6.7.

[b]A variable having loadings on two factors which are not significantly different is assigned to that factor to which it is judged to have the closest affinity.

Source: Table VII-5, pp. 255-6 of A & M.

the importance of the middle class also very significantly increase per capita income. There is a very simple story behind this. Imagine that the low-sample countries are just on the verge of shaking off the institutions and other barriers associated with traditional society. These barriers must be destroyed to lay down the basis for long-term growth. An important component or outcome of that process is the creation of an indigenous middle class, a class composed of men who are inclined to be more entrepreneurial But at this stage, the contribution of this class to development might be a little bit more modest. Abundance of natural resources, or physical overhead capital will certainly have greater impact on per capita income at this stage (Table 6). When a country has reached an intermediate level of development, further development of the so-called middle class as defined here may in fact be a drain on the resources of the economy, as most of the people composing this class are generally unproductive in terms of real goods. It is for this reason that factor loadings for this variable and per capita income have opposite signs (Table 7). But for the countries on the take-off, or those that are driving towards maturity, further growth can be fueled by more of the indigenous middle class, now made up presumably of people engaged more in commerce and entrepreneurial activities than in others (Table 8).

The A & M results are rich in such stories, but the problem is, each story may be told only under the banner of some theory, perhaps *ad hoc*, and only after the results of the quantitative exercises are in. The process of scientific inquiry seems to start with the story behind a variable, say, being told before the facts are in, and then finding out whether or not the story holds after the fact, so to speak. Nevertheless, the A & M results are very significant in that they can potentially weave a single story that makes all the stories related for each variable consistent among themselves. This story, or theory, will constitute the hypotheses for further scientific inquiry. In short, the real significance of the A & M study is its potential to generate testable scientific hypotheses. We will not venture into this but instead move on to another facet of historical change suggested by the A & M results.

An intuitive way to look at factor analysis is to interpret the factor-analytic model (equation (11)) like a regression model with the Fs and Us assumed to be orthogonal between and among themselves. If the Ys, the Fs, and the Us are measured in standard units then

$$(12) \qquad E(Y\,Y') = E[\overline{B}\,\overline{F}\,\overline{F}'\,\overline{B}') + (R\,U\,U'\,R')]$$

$$= \bar{B}[E(\bar{F}\,\bar{F}')]\bar{B}' + R[E(U\,U')]R'$$

where E is the expectations operator. Under the orthogonality assumptions for the Fs and Us, this equation reduces to

(12') $$E(Y\,Y') = \bar{B}\,\bar{B}' + R\,R'$$

The left-hand side of equation (12') is the correlation matrix of the variables Y being factor-analyzed. Now it can be said that the objective of factor analysis is to choose the b_{ik}s composing the matrix $\bar{B}$ such that the sum of squares of each of the elements of $E(Y\,Y') - \bar{B}\,\bar{B}$ is minimized. Note that each of these terms is a component of the actual correlation unexplained by the Fs.

However, note that the actual correlations $E(Y\,Y')$ can be expressed as

(13) $$E(Y\,Y') = A\,E(X\,X')\,A'$$

$$= A\Lambda_x A' = \Lambda_y$$

from equation (8) (with the superscripts and subscripts deleted, and the implicit stochastic component of equation (8) similarly deleted for convenience). In short, factor analysis can be interpreted as the statistical technique that minimizes the sum of squares of each of the elements of the following matrix:

(14) $$A\Lambda_x A' - \bar{B}\,\bar{B}'$$

Here Λ_x is the correlation matrix of the true exogenous determining variables (measured in standard units) in society. The solution to this minimization problem is the matrix of factor loadings, $\bar{B}$.

It is obvious that the matrix of factor loadings $\bar{B}$ can change under only two conditions: (1) either A or Λ_x changes; or (2) both A and Λ_x change. The Xs being exogenous, there is little reason to suppose, theoretically, that Λ_x changes from one time period to the next. Or, if X includes lagged values of Y, Λ_x certainly can change, but only as a result of a previous change in $E(Y\,Y')$. In the ultimate analysis, such a change may be brought about first by a change in A, the matrix of reduced-form coefficients.

The preceding can be put more accurately in the following manner: As one is certainly more prepared to encounter societies in

stationary or semi-stationary states as one travels backward in time, one may be more inclined to accept the proposition that changes in social processes implied by changes in the matrix $\overline{B}$ are triggered by changes in A. However, A can only change if the underlying structural equations of the system change. These changes can be thought of as changes in the rules of the game: When the rules of the game change, behavioral and other structural equations will certainly change (Pejovich, 1982, pp. 383-95). But the question is, when and how do they come about?

Marx and the Marxists have proposed answers to both questions but for our purposes we need not go farther than what our equations suggest. Since the vector X_t in equation (8) exhausts all possible determinants in societal change and if Ω_x is assumed fixed, at least in the beginning of historic change, so to speak, then A must be a function of the levels or absolute values of the Xs. In other words, apart from any theory that explicitly says so, the A & M results showing B of expression (14) to have changed over different subsamples suggest strongly the hypothesis that endogenous variables in societal change are nonlinear functions of independent variables. Theory is required to specify these independent variables. But if the Fs are interpreted as linear combinations of different sets of independent variables, then such a hypothesis can easily be tested.

The ideas presented above justify the statement that Tekiner's article (1981) advances the discussion little, if any. Basing himself on the perfectly valid proposition that since the socioeconomic-political indicators derived by A & M change relatively quite slowly, then, insofar as these indicators capture socioeconomic-political processes, it follows that they can explain subsequent growth of the economy. Tekiner quantifies A & M's factors into component scales, and then uses these scales as regressors to explain subsequent levels of development. The results are presented in Table 9.

It is quite obvious that the variances in per capita income or in per capita energy consumption accounted for by the different factors are quite low, i.e., the explanatory power of the factors is limited. This can be accounted for by the inherent limitation in the Tekiner approach. Since the factor scales are derived by the use of expression (15) below,

$$(15) \qquad F = [\hat{B}' B]^{-1} \hat{B}' Y$$

where F is the vector of factor scales, $\hat{B}$ is the estimated matrix of factor loadings, and Y is the vector of social, political and economic

Table 9 — Regression Results[a]

(A) Sociopolitical institutions and levels of economic performance

OLS V_{60} = — 0.002 + 0.475P_1 + 0.350P_2 + 0.0209P_3 + 0.009P_4 + 0.336P_5			
(0.02) (4.69)* (3.46)* (2.07)*** (0.09) (3.32)*	R^2 = 0.456,	$F(5,48) = 9.88^{**}$	(1a)
OLS V_{63} = — 0.002 + 0.478P_1 + 0.305P_2 + 0.182P_3 + 0.134P_4 + 0.404P_5			
(0.02) (4.87)* (3.11)* (1.85)**** (1.36) (4.11)*	R^2 = 0.489,	$F(5,48) = 11.15^{**}$	(1b)
OLS V_{70} = — 0.002 + 0.404P_1 + 0.192P_2 + 0.098P_3 + 0.288P_4 + 0.382P_5			
(0.02) (3.69)* (1.77)**** (0.90) (2.65)** (3.52)*	R^2 = 0.387,	$F(5,48) = 7.41^{**}$	(1c)
OLS E_{60} = — 0.001 + 0.267P_1 + 0.287P_2 + 0.330P_3 — 0.185P_4 + 0.368P_5			
(0.01) (2.46)** (2.65)** (3.03)* (1.71)**** (3.38)*	R^2 = 0.374,	$F(5,48) = 7.34^{**}$	(1d)
OLS E_{65} = — 0.002 + 0.326P_1 + 0.320P_2 + 0.328P_3 — 0.083P_4 + 0.391P_5			
(0.02) (3.13)* (3.07)* (3.14)* (0.79) (3.74)*	R^2 = 0.423,	$F(5,48) = 8.77^{**}$	(1e)
OLS E_{70} = — 0.002 + 0.350P_1 + 0.300P_2 + 0.300P_3 + 0.073P_4 + 0.409P_5			
(0.02) (3.38)* (2.90)* (3.06)* (0.71) (3.96)*	R^2 = 0.433,	$F(5,48) = 9.11^{**}$	(1f)

[a]Levels of significance: (*) significant at 0.005 level, (**) significant at 0.010 level, (***) significant at 0.025 level, (****) significant at 0.050 level.

Source: Table 3(A), p. 255 of Tekiner.

variables, then the factor scales which are estimated from a $\hat{B}$ that is based on a sample that runs across countries from the lowest to the highest level of development, will not be accurate indicators of the underlying determinants of economic development, especially for those countries at either end of the socioeconomic development spectrum, because as we have seen, the relationship between economic development and its determinants is nonlinear.

4. Society, Politics and Economic Development: Some Hypotheses

Pejovich identifies the Marxist notion of social change with "changes in the rules of the game," (1982, p. 384) and the rules of the game are identified with property relations, which are legal and conventional arrangements that arise from the existence, and pertain to the use of scarce goods (p. 390). This is perfectly consistent with the famous enunciation of Marx's theory.[2]

> "In the social production which men carry on they enter into definite relations that are indispensable and independent of their will; these relations of production correspond to a definite stage of development of their material powers of production. The totality of these relations of production constitutes the economic structure of society — the real foundation, on which legal and political superstructures arise and to which definite forms of social consciousness correspond. The mode of production of material life determines the general character of the social, political, and spiritual processes of life. It is not the consciousness of men that determines their being, but, on the contrary, their social being determines their consciousness. At a certain stage of their development, the material forces of production in society come in conflict with the existing relations of production, or — what is but a legal expression for the same thing — with the property relations within which they had been at work before. From forms of development of the forces of production these relations turn into their fetters. Then occurs a period of social revolution."

In the preceding, the level of development of productive forces is not specified, but if we take note of the fact that to Marx, man's

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[2] T.B. Bottomore and M. Rubel, eds., *Karl Marx: Selected Writings in Sociology and Social Philosophy*, 1963, pp. 67-8.

progress is indicated by how well man masters nature,[3] then we may indicate such progress by per capita income. This indicator captures the degree by which man has liberated himself from the vagaries of nature as this index compares directly with the amount required by man for survival. The basic Marxist proposition is now seen to be quite simple: Given the rules of the game as determined by a dominant form of property rights, per capita income will tend to rise, and this tendency is of course specific to given property relationships. In terms of our equations, equation (8) for instance, the A^{**} is determined. This rise in per capita income is of course made possible by the "development of productive forces," which development is equivalent to the increase in such resources about which the game is conducted: scarce material means of production, technology, and of course, human capabilities. The growth of such resources is also endogenous, i.e., in terms of equation (8), the vector X includes lagged values of endogenous variables in the system.

As levels attained by variables in X reach some critical values, prevailing property rights become "barriers" to further development of productive forces, at which point political changes sooner or later come about to change the rules of the game, and allow development to proceed at a higher pace.

The preceding aspect of Marxist theory can easily be taken into account by the hypothesis that per capita income steadily grows as X grows. At some value of X, per capita income may taper off, but will subsequently grow at a greater rate than before. In fact, if we interpret the "revolutionary" situation as a point where X remains practically constant at that critical value (and so with per capita income), then the preceding interpretation seems to be the most natural one to make. Thus, the most general Marxist proposition can be so stated in a testable form:

H_1 : per capita income rises with X, but beyond some critical value, the rise in income with X will tend to be higher than before.

As stated, the proposition may not be recognized as specifically Marxian. Indeed, it is a proposition that is also consistent with Rostow's stages of growth theory (Rostow, 1963). Evidently, Marxism may be distinguished from other theories by other propo-

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[3] This is clear even in the earlier writings of Marx, such as the *1844 Economic and Philosophic Manuscripts*. Pejovich (1982) has the same interpretation.

sitions which may be economic, political, or sociological in nature. In fact, careful reading of Marx shows that H_1 was a presupposition for Marx, so that much of his later writings were concerned with how and why (if not also with when) the capitalist system of his day could be transformed into something else. Thus, insofar as H_1 is an empirical generalization that other theoreticians accept and also hope to explain, then they and the Marxists can be compared not on the basis of H_1 but only on the basis of their explanations of it.

We will not look into the differences between theories but instead concentrate on a modification of H_1. As Marxists see it, for LDCs in the 20th century, economic development is adversely affected by what is called imperialism. In general, imperialism, however defined, arises when an advanced capitalist country opens economic relations with an LDC. There are certain imperatives guiding the advanced capitalist country (or agents of the advanced country) in its actions vis-à-vis the LDC which lead to certain inevitable results, according to Marxian analysis. Among these are concentration of trade of the LDC with the advanced country, control of mineral extraction in the LDC by capitalists of the other country, and so on and so forth.[4]

The strong Marxist proposition is that for as long as imperialism exists, i.e., for as long as LDCs are bound to an advanced capitalist country, the development of the country is hindered. Weaker variants of the proposition would make the retardative effect of imperialism a function of the strength of the relationship, perhaps indicated by the extent of economic control by the advanced country over the LDC. Yet another camp is composed of those who maintain that such a relationship is in fact contributory to development.[5]

Given the disagreement even within the Marxist camp, what simply emerges is that a variable (or set of variables) that captures the phenomenon of imperialism is taken to be a crucial independent variable in explaining the "development of productive forces." However, to be consistent with Marxist dialectics, we have to make the

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[4] The classic sourcebook on imperialism is of course Lenin, V.I., *Imperialism: The Highest Stage of Capitalist Development.*

[5] For a discussion of the various Marxist issues being raised here, see the excellent review article by Gabriel Palma, "Dependency: A Formal Theory of Underdevelopment or a Methodology for the Analysis of Concrete Situations of Underdevelopment?", *World Development*, Vol. 6 (July/August 1978), No. 718, pp. 881-924.

effectivity of the imperialism variable, which might be treated as external to LDCs, contingent on the strength of internal factors. We may specify the empirical hypothesis we hope to test in the following manner.

Define the following:

Y = per capita GNP
X_i = variable that measures level of development of a productive force, i = 1, . . ., m
Z_j = a variable that measures strength of the imperialist relationship.

Given the preceding, a simple form of the empirical hypothesis is the following:

$$(15) \qquad Y = b_o + \Sigma\, b_i\, X_i + \Sigma\, \hat{b}_i\, X_i^2 + \Sigma\, c_j\, Z_j + \Sigma\Sigma\, c_{ij}\, X_i\, Z_j + \Sigma\, \tilde{c}_j\, Z_j^2 + \in$$

The hypothesis is that man's mastery of nature, proxied by Y, rises with the level of development of productive forces, so that the b_is are expected to be positive. But such a relationship should exhibit a discontinuity at some level of X_i. We simplify this by putting in the squared terms X_i^2, and we expect b_i^2 to be positive. In the case of imperialism, we hypothesize a negative effect on Y, i.e., the c_js are expected to be negative (as the strength of imperialism rises, per capita income falls). However, if domestic, internal forces in an LDC are strong, the effects of imperialism may be mitigated somewhat. Hence, the hypothesis is that the c_{ij}s are positive. The Z_j^2 terms are included to take care of the possibility that the retardative effects of imperialism may even get worse as imperialist control of LDCs increases. Hence, the $\tilde{c}_j$s are expected to be negative.

5. Society, Politics and Economic Development: Some Empirical Results

The variables used in this section are taken from the A & M book except for per capita GNP in 1963 which are from the *UN Statistical Yearbook 1975*. For our purposes the variables from A & M were measured for the period 1957-1962. Our sample consists of 41 countries, rather than 74 as in A & M. This reduction is due to

our failure to get comparable data on per capita GNP for 1963, 1965 and 1967. Our regression equations were generally specified as in equation (15) with Y being defined successively as per capita income for 1963, or an average of 1963 and 1965, or 1965 and 1967, or of all three values, respectively. No significant quantitative differences were found under these different specifications of Y so that for this empirical exercise Y is simply defined as per capita GNP in 1963.

The general thrust of our regression models is to relate per capita GNP to: (1) the level of development of material means of production; (2) strength of feudal forces; (3) strength of capitalist forces; and (4) strength of imperialism or the foreign sector. We have a single indicator of the strength of imperialism which is X_{41} = Structure of Foreign Trade.[6] Generally, this index increases as concentration of export trade on traditional exports falls and as the share of manufactured exports rises. For the first three variables alternative indices are used, as no single index seems to fully represent the desired variable. Economy in the presentation of our results may be achieved if we report our estimates of various specifications of the regression model and discuss the rationale for each specification as the results themselves are interpreted.

The first regression model estimated under OLS resulted in the following estimates, (with t-values in parenthesis under the regression coefficients):

$$\begin{array}{l} (16)\ \hat{Y} = 382 - 8.54\,X_1 + 7.53\,X_5 + 0.64\,X_{27} + 3.37\,X_{34} - 10.65X_{41} \\ \qquad\qquad (-0.80) \quad (0.55) \quad (0.57) \quad (1.83) \quad (-2.51) \\ \\ \qquad - 0.09\,X_1\,X_5 + 0.05\,X_5\,X_{41} + 0.06\,X_1^2 - 0.05\,X_5^2 + 0.07\,X_{41}^2 \\ \qquad\quad (-0.15) \quad\quad (1.22) \quad\quad (1.51) \quad (-0.61) \quad (1.93) \end{array}$$

The variable X_1 stands for "Size of Traditional Agricultural Sector" and measures the share of total employment in traditional agriculture. X_5 on the other hand is supposed to measure "Importance of the Indigenous Middle Class" but is actually a measure of male employment in commerce, banking and insurance, and in technical, professional, and clerical jobs. Thus, X_1 and X_5 are proxies for the strength of the so-called feudal and capitalist sectors of the economy, respectively. X_{27} and X_{34} stand for "Abundance of Natural

[6] The subscripts to the variables used in this section refer to the number of the variable in the list of variables in Table 1.

Resources" and "Level of Adequacy of Physical Overhead Capital," respectively. Hence, these variables proxy for "development of productive forces." X_{41} as we have seen stands for "Structure of Foreign Trade."

We thought it best to include variables such as X_1 and X_5 rather than just X_{27} and X_{34}, i.e., those variables that measure development of productive forces since, in Marxist theory, the jump or discontinuity in human progress arises as an outcome of class struggle. In short, only when a certain class has attained a critical mass will the sudden spurt in economic development arise. There is, furthermore, an explicit formulation that suggests that "capitalism" supersedes "feudalism." Hence, the hypothesis is that the coefficient of X_5^2 should be positive, but it remains an open question as to whether that of X_5 should indeed be positive or negative. One can argue that it be positive because, to the extent that the capitalist sector is more advanced and more productive than the feudal sector, an increase in its size should lead to higher per capita income. On the other hand, one may argue that to the extent that the growth of X_5 below the critical mass implies "class struggle," which might direct resources to that struggle itself rather than to productive activities, then per capita income will be adversely affected, and therefore the coefficient of X_5, or the variable that proxies for the development of capitalism, will have to be negative.

Let us now consider the highlights of equation (16). Its explanatory power is greater than Tekiner's (an $\bar{R}^2 = 0.78$ compared to Tekiner's of less than 0.50), or even that of A & M's factors (which could account for roughly 70 per cent of the variance of Y as compared to our $R^2 = 0.83$). The signs of the coefficients of X_1, X_5, X_{27} and X_{34} are as expected, but those for X_1^2, X_5^2 and X_{41} run opposite to expectations. Fortunately (or unfortunately), the t-values are not significant, except for the coefficient of X_{41}. This may call for some explanation. As X_{41} is measured, this variable may in fact be a composite of foreign influence on the economy, and the relative strength of the feudal and capitalist sectors. For lower values of X_{41}, there is extreme concentration of export trade on two primary commodities, moving on to four primary commodities for intermediate values. At the upper extreme for X_{41}, the four traditional exports account for less than 50 per cent of exports and manufactures now account for more than 20 per cent. Thus, the increase in X_{41} from very low to intermediate values may also capture the increase in the strength of the feudal sector. Unless the strength of foreign influence is great (so that the coefficient of X_{41} should be positive), we should not be surprised with a negative value under

preceding explanation when it arises with positive coefficients for the X_5, X_{41} and X_{41}^2 terms, which we do get (equation (16)). It appears, therefore, that whatever it is that foreign dominance may exert on levels of living or on development of productive forces can hardly be untangled from the effects of a domestic feudal sector (or an advanced capitalist sector).

Let us consider one more estimate after substituting X_4 and X_{40} for X_5. Here X_4 stands for "Character of Basic Social Organization." The lowest value for X_4 corresponds to a social organization where the village clan is dominant, while the highest value corresponds to a society dominated by nuclear families. It is taken to proxy (if imperfectly), for capitalist development as nuclear family systems are assumed to be associated with individualism as in the Western capitalist countries. X_{40} on the other hand stands for "Rate of Improvement of Human Resources," and is actually measured by some weighted average of secondary and higher-level enrolment ratios. Hence, both X_4 and X_{40} can be taken to proxy for level of development of productive forces also, but in the succeeding equation, they are used as proxies for degree of development of the capitalist sector.

$$(17)\ \hat{Y} = 701.22 - \underset{(-1.23)}{2.44 X_1} - \underset{(-2.36)}{10.55 X_4} - \underset{(-1.55)}{6.50 X_{40}}$$

$$+ \underset{(2.97)}{4.35 X_{34}} - \underset{(3.02)}{11.16 X_{41}} + \underset{(0.15)}{0.005 X_{40} X_{41}}$$

$$+ \underset{(2.00)}{0.06 X_4 X_{41}} + \underset{(2.39)}{0.09 X_4^2} + \underset{(2.28)}{0.07 X_{40}^2} + \underset{(2.17)}{0.07 X_{41}^2}$$

$$R^2 = 0.88; \bar{R}^2 = 0.84; F = 22.03$$

The preceding results are quite encouraging. Except for the coefficient of X_{40} X_{41}, t-values are significant at a 5% level of significance or better for all but one (X_1). The fit is even better than equation (16) ($R^2 = 0.88$ and $\bar{R}^2 = 0.84$). The signs of the regression coefficients are as expected. Thus, it appears that certain hypotheses regarding the interaction between social and political variables on the one hand, and economic development on the other, are borne out. In fact, the results may be more significant than they appear at first. Recall that a conventional wisdom that may have dominated public opinion as well as policy in the past (if it does not persist up to now) is the idea that LDCs can develop by promoting capitalist institutions and values. Our results suggest that this is correct as a

long-term historical development. But our results also show that those who believe in it must recognize that if policy is guided by it everything might get worse before they get better, so to speak. A certain hump must be hurdled before the positive effect on per capita income of policies derived from it will come about. And, of course, the Marxists may insist that a political solution is a precondition for hurdling the hump.

6. Conclusion

Adelman and Morris factor-analyzed a group of 41 social, political and economic variables and came out with results rich in insights into the dynamics of societal processes accompanying economic development. However, the technique used by A & M is limited in that it is not capable of testing for causal connections and therefore unsuitable for testing hypotheses. This is not to deny that the results of factor analysis can be given causal interpretation, as we have seen. Still, the technique does not allow measurement of the degree of confidence in such results.

Taking off from what is clearly indicated by the A & M results such as nonlinearities in the relationship between economic development and its determinants, we proceeded to identify what these determinants are and the nature of such nonlinearities. We believe that Marxist theory — the theory itself plus its empirical presuppositions — could provide us with these specifications. Thus, an empirically verifiable hypothesis was elaborated, and subsequently tested using the same set of data used by A & M.

It appears from the empirical results that feudalism, or the traditional agricultural sector, is a barrier to growth. Moreover, the capitalist sector, or the modern or nontraditional sector, is necessary for development (at least for the sample of countries studied). This relationship is not that straightforward. Indeed, a critical level is required before an overall positive effect of the capitalist sector on economic development can come about. The empirical results support the idea that foreign dependence per se may not be that crucial in setting back the development of LDCs. What appears more crucial are the domestic forces of feudalism and capitalism.

While the preceding results appear to be quite unambiguous, it may be pointed out that the sample from which it was derived may have consisted of countries which, in 1962-1967, may all have been underdeveloped. The most developed countries in the sample were

Israel and Japan. The significance of this point is that, if not one of the countries in the sample had made the break from feudal to capitalist development, then it would be inappropriate to give the kind of interpretation that we gave to our empirical results.

We would also have preferred an index of imperialist strength or foreign dependence other than X_{41}. As it is, our results related to this variable do not seem to settle the question of whether foreign dependence is crucial or not. Thus, these qualifications may undermine our basic results. Nevertheless, we feel that these results can withstand further tests, and, if there is anything at all that we have achieved, it is the basic point that Marxist propositions, at least some of them, can be tested empirically.

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