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PATTERNS OF GROWTH AND STRUCTURAL CHANGES IN MIDDLE INCOME COUNTRIES

W. David and P.L. Scandizzo

Economics and Policy Division
Agriculture and Rural Development Department

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Patterns of Growth and Structural Change in Middle Income Countries

by

Pasquale L. Scandizzo and Wilfred L. David

Introduction

With a minimum per capita GNP of US $260, the middle income countries are a somewhat more affluent area of the developing world. The arbitrary cutoff lines separating them from poorer countries imply, however, that even such a summary judgment has to be qualified to be in any way meaningful. First, we are not interested in a single indicator of affluence and economic progress but rather in a composite one, capable of capturing some of the key elements of the economic structure of the countries in question. Second, if these countries are indeed better off than poorer countries and if some of them are better off than others, in terms of incomes, growth rates and the like, questions arise whether these different scores are related to one another and whether, indeed, reasons can be discovered for the different performances of similar countries. Third, we are interested in the possible trade-offs between fast growth in agriculture and in manufacturing at various stages of development and between growth and agricultural exports, food imports, and food production.

Within the broad framework of these three sets of qualifications, this paper addresses some of the basic issues concerning the development profile of the middle income countries and the role of agriculture in the process of structural transformation. This is done by investigating alternative typologies of development on the basis of the available evidence on aggregated growth and structural change and by directly analyzing the same evidence to test hypotheses on the main components of the countries pattern of growth. Throughout the paper, emphasis is put on highlighting issues

* Agriculture and Rural Development Department, The World Bank. The views expressed in this paper are the authors' and are not meant to represent those of the Bank.
related to broad statistical patterns of readily available and recent data.

The paper is divided into five sections. Section 1 briefly reviews some aspects of the literature on the relationship between growth and structural change with a view to highlighting some pertinent hypotheses. Section 2 develops a framework for classifying middle income countries in terms of their economic structure. Here we examine the relative merits of a three-fold classification — semi-industrialized, mineral exporting, and agricultural exporting vis-a-vis a two-fold classification between 'agricultural' and non-agricultural'. The underlying premise is that the possibilities for growth and structural change are somewhat constrained by the type of economic structure exhibited. In Section 3 the pattern and structure of these countries' growth performance are examined by means of regression analysis of standard structural indicators. Similar analytical techniques are used in Section 4 to investigate the relationship between growth performance and the attainment of social progress. Some broad conclusions are brought together in Section 5.

I. MODELS, THEORIES AND HYPOTHESES

Theoretical and empirical analysis of the structural change phenomenon show that there are certain more or less uniform patterns of change which countries experience with per capita income growth. These patterns are of course constrained by factors such as country size, economic structure, forces of history, and the political and social milieu which in turn shape the policies and strategies in specific country environments. The most general model of structural change usually points to a secular decline in the agricultural sector vis-a-vis non-agriculture as per capita income increases. Explanation of observed differences in sector growth rates include (1) changes in the structure of domestic and foreign demand as per capita
income rises and as goods and services with a higher income elasticity of
demand become relatively more important in final consumption; and (2) on the
supply side, the uneven expansion of factor inputs among sectors as well
as differential increases in productivity due to the uneven
adaptation of new processes and techniques.

The historical and empirical evidence on the patterns of change
has led to the generalization that there tends to be an inverse correlation
between living standards and the importance of the agricultural sector in
terms of output and employment. From this it was a relatively short step
to the popular prescription that development necessarily involves a
transfer of resources from agriculture and is by and large coterminous with
industrial development.

The main 'pro-industrial' arguments are the following: (1) industrial-
ization raises incomes by providing higher productivity employment than
agriculture; (2) the rise in industrial sector incomes tends to stimulate
the demand for agricultural products; (3) it provides a potential for
self-sustaining growth through re-investment of profits and through
growth linkages with other sectors which use industrial outputs as inputs; as
such (4) the rise in industrial sector output may reduce input constraints
on agricultural sector expansion. Emphasis is sometimes placed on (5) the
difficulty of introducing modern agricultural technology in traditional

1/ See, for example. Colin Clark, The Conditions of Economic Progress, 3rd ed.
(London: MacMillan, 1957); Simon Kuznets, Economic Growth of Nations: Total
Output and Production Structure, (Cambridge: Harvard University Press, 1971);
Hollis Chenery and Lance Taylor, "Development Patterns: Among Countries
(New York: Oxford University Press, 1975)
agriculture; (6) the higher total capital cost (water, fertilizer, seed, pesticides) in agriculture vis-a-vis industry; and (7) the relative price inelasticity of demand for agricultural products in both domestic and international markets.

We do not propose to examine the relative strengths and weaknesses of these arguments. Our concern is more with their implications for inter-sectoral patterns of growth and the potential role of the agricultural sector in that context. A close reading of the literature does not provide a clearcut answer to this issue. Some pro-industrial arguments tend to support an unbalanced growth strategy, while others support balanced growth. The latter, while supporting a transfer of resources out of agriculture, nevertheless see this as being synonymous with a strong agricultural sector. Thus over time the size of the agricultural sector is expected to stabilize at a level where it can make an optimal contribution to the overall growth process.

This position is supported by some strands of the dual economy models which stress industrial output in excess of population growth, the argument is that surplus population will be drawn from agriculture and that this will be accompanied by an increase in output per head in agriculture.

Assumptions about the conditions of labor supply underlying the classical and neo-classical models of transformation of a dual economy provide some explanation of the factors governing such labor transfers. The
classical models of Lewis 2/ and Fei and Ranis 3/ assume that the supply
of labor is infinitely elastic during the early phase of development, while
the neo-classical model e.g. Jorgenson 4/ assumes that real wages may vary
and that earnings in agriculture proportional to those in industry.

The classical model is essentially concerned with industrial growth
and therefore prescribes a balanced growth path of development. According
to this view, industrial sector expansion requires concurrent development
of agriculture at an appropriate rate, with a stable terms of trade between
the two sectors. Such a balanced growth path is also necessary to keep real
wages in terms of industrial products at a constant level. Therefore, too

2/ W.A. Lewis, "Economic Development with Unlimited Supplies of Labor",
Manchester School, 22, May 1954, pp. 139-191; The Theory of Economic
Growth. (London: Allen and Unwin, 1955); "Unlimited Labor: Further Notes,”
Manchester School, 25(1), (January 1958), pp. 1-32; "Reflections on Unlimited
Labor" in International Economics and Development: Essays in Honour of
pp. 75-96
3/ J.C.H. Fei and G. Ranis, "Unlimited Supply of Labor and the Concept of
pp. 31-58; "The Theory of Economic Development," American Economic Review,
Vol. 51, No. 4, (September 1961), pp. 533-64; Development of a Labor Surplus
Vol. 71, No. 282, (June 1961), 309-334; "Testing Alternative Theories of the
Development of a Dual Economy" Oxford Economic Papers, Vol. 19, No. 3,
(November 1967), 288-312; "The Role of Agriculture in Economic Development:
Classical vs. Neo-classical Models of Growth" in Subsistence Agriculture and
Economic Development (ed) C.R. Wharton, Jr. (Chicago, Aldine 1969)
rapid an expansion in agricultural productivity may retard industrial growth. The central feature of economic transformation in this approach is the reallocation of surplus labor from agriculture to non-agriculture at a fixed real wage rate.

Once the growth process begins, and as intersectoral balance is maintained, the industrial sector is assumed to expand smoothly as labor moves out of agriculture on a continuous basis. When this phase of development is completed, surplus labor is no longer available to the industrial sector at a constant real wage rate. According to Fei and Ranis when this "turning point" between the classical and neo-classical phases is reached, real wages in the non-agricultural sector begin to rise and capital-deepening begins in the agricultural sector.

Hirschman 5/ in his "linkage" concept provides a different rationale for emphasizing certain sectors in the process of development. In his view the best development path lies not in the promotion of balanced growth where every activity expands perfectly in step with each other but by selecting those activities where progress will induce further progress elsewhere. Contextually, development and therefore the process of transformation should not be viewed as a series of alternatives, e.g., agriculture versus industry, but rather in terms of efficient sequences of public investments that tend to maximize "induced" investment decisions. An activity which shows a high degree of interdependence as measured by the proportion of output sold to other industries (forward linkage) and the proportion of output that represents purchases from other industries (backward linkage)

should be established early in the development process because of the growth stimulus emanating from output using and input supplying industries.

The real issue, however, concerns the processes which will develop and maintain an appropriate "balance" between agriculture and non-agriculture. 6/ The concern is the extent to which agricultural growth and development is made commensurate with that of other sectors of the economy. Whether agriculture has the "ability to lead" or "needs to follow" other sectors during the process of transformation cannot be addressed on a priori grounds and must depend on individual country experiences. What is important is that some countries have made considerable progress in emphasizing agricultural development and can continue such policies even at more advanced stages of development. Once countries reach a stage in their development where output, employment and exports are expanding along broad fronts, agriculture may become less crucial in sustaining the development process. Nevertheless, for the majority of middle income countries, a substantial agricultural potential still exists. Others are hampered by inadequate agricultural growth. Some, especially those whose development has been based on mineral exports, have large and very rural areas whose problems are indistinguishable from their low income counterparts.

Even if the process of economic growth is accompanied by a pattern of structural change which reflects increasing complementarity between agricultural and non-agricultural sectors, a further question can be asked whether such economic performance is accompanied by comparable movements in broader social welfare. Such measures of social progress include income redistribution, improved income earning opportunities, poverty alleviation and the provision of basic needs.

In this connection, three types of evidence have been marshalled about the relationship between economic growth and social progress: long-run evidence based on the historical experience of the contemporary developed world; cross-sectional evidence comparing countries at different stages in development at a particular point in time; and time-series evidence from the recent history of particular developing countries.

Kuznets in his studies of the long term patterns of change in the developed countries hypothesized that these countries passed through three stages -- a pre-industrial stage of relative equality, an industrialization phase of relative inequality and modern phase of reduced inequality (the inverted S-Curve). When applied to the developing countries such a pattern is expected to emerge because of several factors: inequalities in the initial distribution of productive assets, especially land; population shifts from the agricultural to the capital-intensive and higher-productivity industrial sector; and the increasing demand for skilled labor in the latter sector leading to increasing inequality since the supply of skilled labor expands relatively slowly. If one assumes that

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the middle income countries are, by and large, at the second stage, then one would expect that they would have a more unequal distribution than their poorer counterparts.

However, it has been suggested that there are possibly two reasons why one should not expect the patterns of change in middle income countries to fit the historical development profile of developed countries. First, account has to be taken of the change in population and technology and second, of changes in social structure including social institutions, property and payment systems, government policies, and the like. 8/

While recent cross-sectional studies lend general support to the Kuznets' hypothesis, opinions differ on the extent of increases in inequality. The studies of Adelman and Morris 9/ show that there has been an increase in absolute inequality, whereas the studies of Ahluwalia 10/ conclude that while relative inequality might have increased, this was not necessarily the case for absolute inequality since the absolute income levels of poorer groups tended to rise more slowly than the average. For example, some middle income countries (Brazil, Mexico, Turkey, the Philippines) which have experienced moderate to fast rates of GNP growth as well as sharp increases in relative inequality tended to show some improvement in the absolute income levels of the poor.

8/ For an elaboration see Frances Stewart, "Inequality, Technology and Payments Systems", World Development, Vol. 6, No. 3, (March 1978)


On the other hand, the studies of Griffin and Khan \(11/\) for South East Asian countries, reach more drastic conclusions. They find that both absolute and relative impoverishment worsened for all countries studied irrespective of their growth performance, with the People's Republic of China a notable exception. While coverage of the studies by Griffin and Khan and those of Ahluwalia, Chenery and others differ, it seems that the find Khan do not conflict with the cross-sectional or time-series data in that all the countries they studied are moving from the pre-industrial to the industrial stage, in which case one would expect inequality to increase. However, there are no observed uniformities in magnitude of changes among the different country typologies -- semi-industrialized, mineral exporters or agricultural exporters.

The co-existence of rapid economic growth and increasing relative inequality in some countries is probably a reflection both of inherent structural characteristics as well as the development policies and strategies pursued. The success in maintaining fairly impressive rates of economic growth, and in overcoming destabilizing effects of short-term disturbances, might have obscured several deep-seated and intractable structural problems. Such problems cast doubt on the appropriateness of past development strategies, and in many cases suggest for a redirection of emphasis. \(12/\)


<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 Semi-industrial Countries</th>
<th>Group 2 Agric. Exporters</th>
<th>Group 3 Mineral Exporters</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAGR</td>
<td>3.8400</td>
<td>3.4833</td>
<td>0.2571</td>
<td>2.8276</td>
</tr>
<tr>
<td>AGEREXP</td>
<td>79.6000</td>
<td>85.7500</td>
<td>96.5114</td>
<td>86.2414</td>
</tr>
<tr>
<td>AGRLAB</td>
<td>43.9000</td>
<td>57.2500</td>
<td>53.1429</td>
<td>51.6552</td>
</tr>
<tr>
<td>PCFOOD</td>
<td>107.3000</td>
<td>109.1667</td>
<td>101.0000</td>
<td>106.5517</td>
</tr>
<tr>
<td>LITER</td>
<td>75.8000</td>
<td>59.5833</td>
<td>42.4286</td>
<td>61.0345</td>
</tr>
<tr>
<td>LND</td>
<td>0.1606</td>
<td>0.1737</td>
<td>0.1663</td>
<td>0.1543</td>
</tr>
<tr>
<td>GRIND</td>
<td>7.7700</td>
<td>6.8167</td>
<td>8.3143</td>
<td>7.5069</td>
</tr>
<tr>
<td>GRPOP</td>
<td>2.4700</td>
<td>2.8167</td>
<td>2.9286</td>
<td>2.7241</td>
</tr>
<tr>
<td>POP</td>
<td>37.4400</td>
<td>10.9833</td>
<td>24.8286</td>
<td>23.4483</td>
</tr>
<tr>
<td>GRGDP</td>
<td>6.3500</td>
<td>5.5333</td>
<td>6.4571</td>
<td>6.0379</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 Semi-industrial Countries</th>
<th>Group 2 Agric. Exporters</th>
<th>Group 3 Mineral Exporters</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAGR</td>
<td>2.6713</td>
<td>2.0718</td>
<td>4.7102</td>
<td>3.3070</td>
</tr>
<tr>
<td>AGEREXP</td>
<td>23.1804</td>
<td>10.1006</td>
<td>4.8255</td>
<td>16.1248</td>
</tr>
<tr>
<td>AGRLAB</td>
<td>15.3511</td>
<td>15.0582</td>
<td>15.1375</td>
<td>15.7917</td>
</tr>
<tr>
<td>LITER</td>
<td>14.5587</td>
<td>22.6929</td>
<td>19.4667</td>
<td>22.8132</td>
</tr>
<tr>
<td>LND</td>
<td>0.1169</td>
<td>0.1110</td>
<td>0.0796</td>
<td>0.1055</td>
</tr>
<tr>
<td>GRIND</td>
<td>5.1043</td>
<td>4.0029</td>
<td>5.0555</td>
<td>4.5319</td>
</tr>
<tr>
<td>GRPOP</td>
<td>0.6075</td>
<td>0.4877</td>
<td>0.3729</td>
<td>0.5222</td>
</tr>
<tr>
<td>POP</td>
<td>30.6110</td>
<td>14.2530</td>
<td>24.7521</td>
<td>25.4807</td>
</tr>
<tr>
<td>GRGDP</td>
<td>3.5243</td>
<td>2.5144</td>
<td>2.2926</td>
<td>2.7911</td>
</tr>
</tbody>
</table>

GRGDP = rate of growth of GDP (1970-76)
GRAGR = rate of growth of agricultural GDP (1970-76)
GRIND = rate of growth of manufacturing GDP (1970-76)
GRPOP = rate of growth of population (1970-76)
PCFOOD = index of per capita food production (1976)
AGRLAB = percentage of labor force in the agricultural sector (1976)
AGREP = percentage of agricultural GDP over total GDP (1976)
AGREXP = percentage share of merchandise exports in primary commodities
LITER = adult literacy rate (1976)
LND = agricultural land as percentage of total land (1976)
2. COUNTRY CLASSIFICATION

In order to carry out a systematic statistical analysis of the relationship between growth and structural change all countries classified as middle income by the World Bank 13/ were considered primary candidates for inclusion in our sample. In some instances, however, data limitations forced us to use different subsamples depending on the indicators selected and the phenomena analyzed. Our first task was to design a framework for categorizing middle income countries based on a three-fold classification — agricultural exporters, mineral exporters, and semi-industrialized — using a sample of 29 countries. 14/

Discriminant analysis 15/ was used as a tool for comparing group means, to predict group membership, and in general to test the significance of the three-fold classification. Contextually, ten standard socio-economic indicators were used to measure the potential development pattern facing each group. These are: GDP growth; agricultural GDP growth; manufacturing GDP growth; population growth; per capita food production; percentage of the labor force in agriculture; agricultural GDP as a percentage of total GDP; the share of primary commodities in merchandise exports; the percentage share of


14/ Agricultural Exporters — Ghana, Ivory Coast, Malaysia, Thailand, Paraguay, most Central American countries and Egypt;

Mineral Exporters — Zambia, Morocco, Algeria, Venezuela, Nigeria, Iran and Iraq;

Semi-industrialized — Brazil, Mexico, Argentina, Colombia, Chile, Turkey, Tunisia, Korea, Taiwan and the Philippines. This grouping excludes countries such as Portugal, Romania, and Yugoslavia whose level of development warrants that they be put into a higher category of industrialization.

total land devoted to agriculture; and the adult literacy rate.

The means and standard deviations for these variables, as well as the totals for each of the three country groupings are presented in Table 1. These computations show that for all the indicators the country averages tend to depart from each other and from the total by appreciable amounts. However, on an a priori basis, it is not clear whether these differences are statistically significant, especially where they are considered simultaneously. This arises because of the large variations of virtually all indicators within each country group.

Based on the above finding, it was therefore decided to investigate whether there exists a minimum set of variables containing enough information for predicting group membership for the countries examined. The indirect objective was also to identify (i) those variables for which group mean differences were statistically significant at some reasonable confidence level, and (ii) the best discriminators, i.e. those variables whose use in classifying the observations pertaining to one or more categories would minimize the risk of misclassification.

On the basis of linear discriminant functions 16/, four variables seemed to capture most of the information contained in the classification are proposed. Two of these — (a) the agricultural growth rate, and (b) the percentage of agricultural labor in the total labor force — are directly related to the performance of the agricultural sector and the relative balance between agriculture and industry in the typical economy. The other two variables — (c) population size and (d) the literacy rate — tend to mirror the more general

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16/ The technique used was minimization of Wilk's lambda with equal probabilities. See R.A. Eissenbjes and R.B. Avery, op. cit., pp. 10, 31, 70 - 71.
characteristics of the countries concerned. For the four variables mentioned above, the hypothesis of equality among the group means is rejected at any reasonable level of confidence.

The classification function co-efficients are reported in table 2. The following four patterns are apparent: (i) on average, the agricultural growth rates are much higher for both semi-industrialized and agricultural exporting countries when compared with their mineral exporting counterparts; (ii) similar patterns are also noticeable when literacy rates are compared; (iii) population is mostly concentrated in the semi-industrial and mineral exporting countries, and (iv) agricultural exporting countries have systematically larger shares of their labor force in agriculture.

Based on these four patterns, Table 3 presents the results obtained by using the discriminant functions to predict group membership. Although it is clear that while the overlapping between Group 1 and 2 (semi-industrialized and agricultural exporters) is not high, the group of mineral exporters has characteristics of and/or includes countries which might be classified in one of the other two groups. Since a full 41% of the cases are misclassified, the first attempt at classification was only moderately successful.

A second attempt was made to test the country typology proposed by reducing the subsample to 22 countries having more homogeneous group characteristics. 17/ In this case, a new potentially explanatory variable -- the percentage of the import bill accounted for by food (AGRIMP) was introduced. Under this new configuration, five variables now appear to constitute the best linear combination of discriminators among groups and as predictors of group membership for unclassified observations. Two of these

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17/ The countries are the same as before, but excluding Paraguay, El Salvador, Guatemala, the Dominican Republic, Mexico, Peru, Chile, Taiwan and Algeria.
### Table 2
CLASSIFICATION FUNCTION COEFFICIENTS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1: Semi-Industrial</th>
<th>Group 2: Agric. Exporters</th>
<th>Group 3: Mineral Exporters</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAGR</td>
<td>0.029</td>
<td>0.029</td>
<td>-0.271</td>
</tr>
<tr>
<td>AGRLAB</td>
<td>0.465</td>
<td>0.529</td>
<td>0.452</td>
</tr>
<tr>
<td>LITER</td>
<td>0.402</td>
<td>0.379</td>
<td>0.311</td>
</tr>
<tr>
<td>POP</td>
<td>0.033</td>
<td>-0.028</td>
<td>0.006</td>
</tr>
</tbody>
</table>

### Table 3
29 COUNTRY TYPOLOGY - PREDICTION RESULTS

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>No. of Cases</th>
<th>Predicted Group Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>GP. 1</td>
</tr>
<tr>
<td>Group 1: Semi-industrial Countries</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70.0%</td>
</tr>
<tr>
<td>Group 2: Agricultural Exporters</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.3%</td>
</tr>
<tr>
<td>Group 3: Mineral Exporters</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28.6%</td>
</tr>
</tbody>
</table>

Percent of "Grouped" cases correctly classified: 68.97%
variables -- the rate of growth of agricultural GDP (GRAGR) and the share of primary commodities in merchandise exports (AGREXP) directly relate to the performance of the agricultural sector. The remaining three -- the GDP growth rate (GRGDP), the population growth rate (GRPOP), and the percentage of food imports (AGRIMP) are more a reflection of overall economic performance.

The information in Table 4 shows once again that the classification function coefficients for the three-group country classification mainly reflects differences among the means. Apart from the already noted difference among agricultural growth rates, the semi-industrialized (Group 1) and agricultural exporting (Group 2) countries are comparable in terms of export shares, while the agricultural exporters (Group 2) and mineral exporters (Group 3) are closer in terms of both import shares and population growth rates. Further, the overall growth performance is highest for the semi-industrial group and lowest for agricultural exporters.

Where prediction results are checked (Table 5), the subsample classification appears to be more successful than the previous one. Overall, about 82% of all cases are correctly classified and no significant overlap between groups appears to exist except for the case of two observations in the last group. However, the number of mineral exporters is too small to provide a sufficiently robust test of the classification.

Having arrived at an apparently satisfactory framework for classification, a question was then asked as to whether the analysis revealed any pattern in addition to those previously observed for mean and classification function differences? We tried to answer this question by computing the coefficients of the standardized discriminant functions shown in the following table. These coefficients can be interpreted as
Table 4
CLASSIFICATION FUNCTION COEFFICIENTS

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAGR</td>
<td>-0.02869</td>
<td>-0.37678</td>
<td>-0.87712</td>
</tr>
<tr>
<td>AGREXP</td>
<td>0.28469</td>
<td>0.28751</td>
<td>0.35733</td>
</tr>
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<td>AGRIQP</td>
<td>0.51468</td>
<td>0.81939</td>
<td>0.80168</td>
</tr>
<tr>
<td>GRPOP</td>
<td>7.36647</td>
<td>12.97958</td>
<td>12.08767</td>
</tr>
<tr>
<td>GRGDP</td>
<td>0.67356</td>
<td>-0.15192</td>
<td>0.40358</td>
</tr>
<tr>
<td>Constant</td>
<td>-24.20054</td>
<td>-35.97636</td>
<td>-41.62683</td>
</tr>
</tbody>
</table>

Table 5
22 COUNTRY TYPOLOGY - PREDICTION RESULTS

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>No. of Cases</th>
<th>Predicted Group Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>GP. 1</td>
</tr>
<tr>
<td>Group 1</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>85.7%</td>
</tr>
<tr>
<td>Group 2</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11.1%</td>
</tr>
<tr>
<td>Group 3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Percent of "Grouped" cases correctly classified: 81.82%
weights of an index of the five variables selected, i.e. -- the growth rate of agricultural GDP (GRAGR), the share of primary commodities in merchandise exports (AGREXP), the share of food imports in total imports (AGRIMP),

<table>
<thead>
<tr>
<th></th>
<th>FUNC 1</th>
<th>FUNC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAGR</td>
<td>0.35445</td>
<td>0.69364</td>
</tr>
<tr>
<td>AGREXP</td>
<td>-0.15574</td>
<td>-0.74338</td>
</tr>
<tr>
<td>AGRIMP</td>
<td>-0.51979</td>
<td>0.29214</td>
</tr>
<tr>
<td>GRPOP</td>
<td>-0.64910</td>
<td>0.57188</td>
</tr>
<tr>
<td>GRGDP</td>
<td>0.33276</td>
<td>-1.10352</td>
</tr>
</tbody>
</table>

Centroids of Groups in Reduced Space

<table>
<thead>
<tr>
<th></th>
<th>FUNC 1</th>
<th>FUNC 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>1.14495</td>
<td>-0.09105</td>
</tr>
<tr>
<td>Group 2</td>
<td>-0.43949</td>
<td>0.54412</td>
</tr>
<tr>
<td>Group 3</td>
<td>-0.67655</td>
<td>-0.70996</td>
</tr>
</tbody>
</table>

the population growth rate (GRPOP), and the GDP growth rate (GRGDP). In order to analyze the case in hand, two indicators were computed. The first (Func. 1) explains more than 65% of the intergroup variance, with the second (Func. 2) explaining about 25%.

In the first index both the agricultural and overall growth rates receive positive weights, population growth rates, agricultural export and food import shares receive the highest average score (normally referred to as the "centroid" of the group), with agricultural and mineral exporters receiving progressively lower ones. The index can therefore be tentatively interpreted as a measure of both the overall economic performance and the
pattern of industrialization. Accordingly, it is reasonable to conclude
that the higher the joint growth of agriculture and the rest of the
economy, and the lower the growth in population, the agricultural export
share and the food import share, the probability of a country being
classified as a semi-industrialized one becomes highest.

The interpretation of the second index proved somewhat more cumbersome. Prima
facie, since the index shows a high positive sign for agricultural growth and an
even higher negative one for GDP growth, it seems to partly reflect a trade-off
between agricultural and overall economic performance. Thus, food import
dependence and population growth are both positively weighted, while
agricultural export shares receive a negative weight in the index. Of
some significance, however, is the fact that the index records the highest
average score for agricultural exporting countries. As such it conforms
to further evidence from cross-country regression analysis reported in the
next section of the paper. On this basis it can be interpreted as an
index of a country’s performance during the earlier stage of the develop-
ment process. The evidence marshalled in the next section shows that this
stage is usually characterized by a trade-off between agricultural and
industrial growth.

However, before proceeding to that part of the analysis, comments
on some ancillary issues pertaining to the classification framework would
seem to be in order. It is evident from the test of the three-fold
classification that such a framework is not necessarily the most convenient
for investigating differential performance across countries. First, the group
of mineral exporters in the sample is too small for meaningful hypothesis
testing. From another perspective, the results of the discriminant analysis
themselves indicate that a two-fold classification adequately captures most of the information contained in the three mean group differences for the selected variables. Furthermore, the increase in intra-group variability that stems from a reduction from a three-group to a two-group classification substantially increases the explanatory power of the structural indicators.

In the move from a three-fold to a two-fold classification, several interesting patterns emerge. The first point of interest is that the balance between agriculture and the rest of the economy, more than any other feature, seems to be the key element depicting the distinctiveness and heterogeneity of the middle income countries. With the exception of three countries -- Mauritania, Ghana and Sudan (where agricultural GDP accounts for 35% or more of total GDP), for all middle income countries the agricultural sector contributes both a small and decreasing proportion of national domestic product. In comparison to "poor" countries (those with less than US$260 per capita GNP, and where agricultural GDP is rarely below 40% of total GDP, with a median of 45%), middle income countries also show a concentrated distribution of agricultural GDP shares. In this case the median value clusters around 21% of GDP with very insignificant positive or negative variations from this value.
3. THE STRUCTURE OF GROWTH PERFORMANCE

The analysis of inter-group differences performed in the previous section suggests that the macroscopic differences in the economic base of a typical country (i.e. semi-industrial, agricultural or mineral) tend to be reflected in relative differences in performances of the agricultural sector vis-a-vis the whole economy. Apparently, there is no simple correlation between the growth rates attained and the overall development patterns observed. However, the results of the discriminant analysis do suggest significant multiple correlations. Furthermore, both inter-group and intra-group variances are high for all the structural indicators considered in the analysis of alternative country classifications. What this suggests is that although we can expect relatively similar performance levels in the case of those countries with a similar balance between agricultural and manufacturing activities as well as in the base for economic growth, the differences in other structural indicators nevertheless maintain a high level of variability in the sample. Because of country-group heterogeneity, it is not possible to clearly identify the reasons for inter-group differences in agricultural production and growth. However, the same variability can prove as an important asset in hypothesis testing. One such hypothesis is that the intra-group success and failure stories tend to be caused by the differences in patterns of development embraced by choice or necessity in each country.

We now address some specific issues relating to the growth performance of middle-income countries. In general, the objective is to explore some broad questions concerning the relationship between economic growth and structural change, with particula
attention to the role of the agricultural sector. First, is there a significant statistical correlation between agricultural performance and structural change as depicted by the indicators previously mentioned? Second, to the extent that meaningful associations can be found, are they consistent with the findings of other empirical studies, such as those mentioned in Section 1, the popular hypotheses on economic growth and structural change, or ultimately what could be predicted from common sense? Third, can any meaningful historical lessons and/or broad policy conclusions be drawn from these statistical results?

Of course, the answers to such questions depend on the interpretations given to the various patterns of transformation observed for the alternative country typologies in which we are interested. In general, however, one would expect that as a country moves from one stage of development to another — say, from a 'pre-industrial' to a 'semi-industrial' stage, increasing sectoral interaction is likely to take place. Under such circumstances, agricultural sector growth is usually a pre-condition for industrial development as agricultural productivity rises; or alternatively, with the development of the industrial sector contributing significantly to agricultural development — in other words, with the 'industrial revolution' accompanied at some stage by an 'agricultural revolution'.

Table 7 portrays the structural indicators for an overall sample of 32 middle income countries further separated into two subsamples — 'agricultural' and 'non-agricultural' countries on the basis of the percentage share of the agricultural sector in total GDP. By and large, the subsample
of 'nonagricultural' countries now comprises those countries where agriculture's share in GDP is less than or equal to the median value. The remaining countries are designated as 'agricultural' and are predominantly agricultural exporters. When compared to the original three-fold classification, the present two-fold reclassification does not seem to produce any major change with respect to the group means of non-agricultural vis-a-vis agricultural countries. The only exception is the agricultural growth rate. Furthermore, the two-fold classification is more or less consistent with the one tested by using discriminant analysis. (See Section 3)

In order to analyze the possible association between agricultural performance and the structural parameters reported in Table 7, we used a quadratic equation to account for nonlineairties. Table 8 reports the results of the regression models which were estimated. While the robustness of the results was checked on several alternative models, the three equations reported in the table provide some useful information about the variables associated with higher agricultural growth.

First, the results suggest that the degree of export orientation of the agricultural sector provides a significant explanation of the variance of agricultural growth. However, its effect on the agricultural growth rate is substantial only in the case of agricultural countries where, on average, an increase of one percentage point in the share of agricultural exports is associated with an increase of about 1.2% in the agricultural growth rate. It should be pointed out that some of the countries in this

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18/ The non-agricultural group includes Jordan, Syria, Korea, Jamaica, Brazil, Iraq, Yugoslavia, Portugal, Iran, Hong Kong, Venezuela, Singapore and Congo. The agricultural group comprises Togo, Egypt, Cameroon, Sudan, Thailand, Honduras, Senegal, Philippines, Liberia, Morocco, Ghana, Ivory Coast, Colombia, Zambia, Nicaragua, Tunisia, Malaysia, Turkey and Costa Rica.
Table 7: SELECTED INDICATORS OF GROWTH AND ECONOMIC STRUCTURE
(32 COUNTRY SAMPLE)

<table>
<thead>
<tr>
<th></th>
<th>Agricultural Countries</th>
<th></th>
<th>Non-Agricultural Countries</th>
<th></th>
<th>All Countries in the Sample</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAGR %</td>
<td>4.18</td>
<td>(2.40)</td>
<td>1.45</td>
<td>(4.10)</td>
<td>3.07</td>
<td>(3.43)</td>
</tr>
<tr>
<td>AGREXP %</td>
<td>83.16</td>
<td>(18.12)</td>
<td>74.23</td>
<td>(33.56)</td>
<td>79.53</td>
<td>(25.42)</td>
</tr>
<tr>
<td>AGRIMP %</td>
<td>15.00</td>
<td>(7.59)</td>
<td>15.69</td>
<td>(6.36)</td>
<td>15.28</td>
<td>(7.02)</td>
</tr>
<tr>
<td>AGRLAB %</td>
<td>63.32</td>
<td>(15.25)</td>
<td>37.31</td>
<td>(19.12)</td>
<td>52.75</td>
<td>(21.10)</td>
</tr>
<tr>
<td>PCFOOD %</td>
<td>108.68</td>
<td>(18.05)</td>
<td>106.62</td>
<td>(35.93)</td>
<td>107.84</td>
<td>(26.27)</td>
</tr>
<tr>
<td>LITER %</td>
<td>46.68</td>
<td>(29.35)</td>
<td>64.31</td>
<td>(19.33)</td>
<td>53.84</td>
<td>(26.87)</td>
</tr>
<tr>
<td>LND %</td>
<td>17.93</td>
<td>(12.07)</td>
<td>15.84</td>
<td>(11.60)</td>
<td>17.08</td>
<td>(11.81)</td>
</tr>
<tr>
<td>GRIND %</td>
<td>7.05</td>
<td>(3.59)</td>
<td>8.40</td>
<td>(6.37)</td>
<td>7.60</td>
<td>(4.86)</td>
</tr>
<tr>
<td>GRFOP %</td>
<td>2.65</td>
<td>(0.48)</td>
<td>2.43</td>
<td>(0.98)</td>
<td>2.56</td>
<td>(0.72)</td>
</tr>
<tr>
<td>POP %</td>
<td>16.75</td>
<td>(15.68)</td>
<td>17.33</td>
<td>(29.35)</td>
<td>16.99</td>
<td>(21.83)</td>
</tr>
<tr>
<td>GRGDP %</td>
<td>5.66</td>
<td>(2.42)</td>
<td>6.63</td>
<td>(2.80)</td>
<td>6.06</td>
<td>(2.58)</td>
</tr>
<tr>
<td>Observations</td>
<td>19</td>
<td></td>
<td>13</td>
<td></td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>

GRGDP = rate of growth of GDP (1970-76)
GRAGR = rate of growth of agricultural GDP (1970-76)
GRIND = rate of growth of manufacturing GDP (1970-76)
GRFOP = rate of growth of population
PCFOOD = index of per capita food production (1976)
AGRLAB = percentage of labor force in the agricultural sector
AGRGDP = percentage of agricultural GDP over total GDP
AGREXP = percentage share of merchandise exports in primary commodities
AGRIMP = percentage share of merchandise imports in food
LITER = adult literacy rate
LND = agricultural land as percentage of total land
<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>AGREXP</th>
<th>(AGREXP)^2</th>
<th>LITER</th>
<th>(LITER)^2</th>
<th>LND</th>
<th>GRIND</th>
<th>(GRIND)^2</th>
<th>GRPOP</th>
<th>(GRPOP)^2</th>
<th>DUMMY^1/</th>
<th>R^2</th>
<th>OBSERV.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall sample</td>
<td>-2.282</td>
<td>0.065</td>
<td>--</td>
<td>0.080</td>
<td>--</td>
<td>--</td>
<td>0.395</td>
<td>-0.026</td>
<td>-0.798</td>
<td>--</td>
<td>-2.097</td>
<td>0.394</td>
<td>32</td>
</tr>
<tr>
<td>(1.97)</td>
<td>(3.20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(1.20)</td>
<td>(1.73)</td>
<td></td>
<td>(0.71)</td>
<td></td>
<td>(1.732)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-agricultural</td>
<td>-29.375</td>
<td>0.034</td>
<td>0.0006</td>
<td>0.656</td>
<td>-0.0048</td>
<td>0.14</td>
<td>0.722</td>
<td>-0.045</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.915</td>
<td>13</td>
</tr>
<tr>
<td>Countries</td>
<td>(0.298)</td>
<td>(0.600)</td>
<td>(2.982)</td>
<td>(2.526)</td>
<td></td>
<td>(2.084)</td>
<td>(2.431)</td>
<td></td>
<td>(0.409)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agric.</td>
<td>-8.594</td>
<td>1.256</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1.999</td>
<td>0.195</td>
<td>24.370</td>
<td>4.481</td>
<td>0.538</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Countries</td>
<td>(2.785)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2.261)</td>
<td>(2.566)</td>
<td>(2.382)</td>
<td>(1.421)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The numbers in parenthesis are "t" ratios.

^1/ This variable is equal to one if then GDP agricultural share is less than 0.2 and 0 otherwise.
subsample have clearly chosen a pattern of development emphasizing growth in agricultural exports. Malaysia, Thailand, and to a lesser extent Togo and the Philippines are representative examples.

Second, among the non-agricultural countries, the ones with higher literacy rates fare consistently better in agricultural growth than the others. This effect is remarkable both because of its magnitude and consistency of sign (always positive in the range of countries considered) and because of the low and insignificant simple correlation between agricultural growth and literacy rates (the linear correlation coefficient between the two variables is -0.01).

Third, while industrial growth seems on average to have a positive effect when the pooled data are considered, the separate subsample estimates show a significant positive effect for the non-agricultural countries, and a much larger but significantly negative effect for the agricultural ones. It thus seems that the countries of the agricultural group face a trade-off between agricultural and industrial growth and that, once the effects of other variables are taken into account, countries with more successful industrialization programs will also have to accept a lower rate of success in agricultural growth. For the semi-industrial and mineral exporting countries, on the other hand, the situation is reversed, perhaps because of the unbalanced growth pattern characteristics of most of these countries or, as we may speculate, because the trade-off between agriculture and industry is only a property of an earlier stage of development (mostly represented by the countries of the agricultural group). This latter speculation is also confirmed by the fact that the population growth rate has a large, significant and negative impact only on the sector
growth of the agricultural countries.

Table 9 extends the above analysis to two additional performance variables - the index of per capita food production and the rate of growth of gross domestic product. In both cases, the equations estimated on the selected subsamples are significantly different from each other and from the ones estimated for the pooled data. Also a much larger proportion of the variance of the performance variable (ranging from 75% to 97%) appears to be explained by the selected regressors.

In the case of food production, the rate of growth of the agricultural sector has one major positive effect for the non-agricultural group, while the same variable has a negative effect for the agricultural countries. In part, this result is related to the strong positive correlation found for the agricultural countries between agricultural growth rates and primary export share and can be explained by the higher export orientation of agricultural production in the agricultural group. In terms of a mere comparison of performance, it is also important to note that not unlike industrial and agricultural growth, food production and expansion of the agricultural sector shows a negative trade-off only for the middle income countries representing the earlier stage of economic development.

Within the non-agricultural group, however, important contributors to increased per capita food production are both trade-orientation (as measured by the percentage of exports accounted for by primary commodities and by the percent of imports accounted for by food) of the agricultural sector, and the relative size of the non-agricultural part of the economy. Thus higher rates of food production are associated with both higher (relative) exports and higher (relative) food imports.
Table 9: AVAILABLE PER CAPITA FOOD AND GDP GROWTH RATE AS A FUNCTION OF OTHER SOCIO-ECONOMIC VARIABLES

- Regression Coefficients -

<table>
<thead>
<tr>
<th>Variable</th>
<th>PCFOOD Non-agricultural Countries</th>
<th>Agricultural Countries</th>
<th>GROGDP Non-agricultural Countries</th>
<th>Agricultural Countries A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAGR</td>
<td>2.680 (3.07)</td>
<td>-9.246 (1.87)</td>
<td></td>
<td>-0.056 (0.49)</td>
<td>0.0048 (1.60)</td>
</tr>
<tr>
<td>SCRAGR</td>
<td>1.643 (2.93)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGREXP</td>
<td>2.541 (5.16)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(AGREXP)²</td>
<td>-0.022 (5.50)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGRIHPR</td>
<td>10.771 (2.93)</td>
<td>4.114 (1.44)</td>
<td>0.811 (1.01)</td>
<td>-0.003 (3.00)</td>
<td>-0.391 (1.71)</td>
</tr>
<tr>
<td>(AGRIHPR)²</td>
<td>-0.457 (3.81)</td>
<td>-0.083 (1.28)</td>
<td>-0.044 (1.41)</td>
<td>0.0092 (1.61)</td>
<td>0.002 (1.25)</td>
</tr>
<tr>
<td>AGRIAB</td>
<td></td>
<td>1.463 (3.56)</td>
<td>-0.013 (3.51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(AGRIAB)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCFOOD</td>
<td>-0.490 (2.59)</td>
<td></td>
<td>-0.490 (2.59)</td>
<td>0.0016 (2.68)</td>
<td>-0.297 (2.28)</td>
</tr>
<tr>
<td>(FCFOOD)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGRGDP</td>
<td>-18.777 (4.64)</td>
<td>0.827 (4.11)</td>
<td>-8.936 (3.44)</td>
<td>0.370 (3.36)</td>
<td>0.158 (1.31)</td>
</tr>
<tr>
<td>LITE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LITE)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRGDP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(GRGDP)²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PGP</td>
<td>3.050 (2.42)</td>
<td>-0.044 (1.57)</td>
<td>8.796 (3.56)</td>
<td>7.29 (3.17)</td>
<td></td>
</tr>
<tr>
<td>(POP)²</td>
<td></td>
<td></td>
<td></td>
<td>0.31 (2.07)</td>
<td>-0.005 (1.67)</td>
</tr>
<tr>
<td>Constant</td>
<td>101.943</td>
<td>-21.897</td>
<td>49.825</td>
<td>32.083</td>
<td>55.024</td>
</tr>
<tr>
<td>R²</td>
<td>0.969</td>
<td>0.746</td>
<td>0.793</td>
<td>0.857</td>
<td>0.823</td>
</tr>
<tr>
<td>Observations</td>
<td>13</td>
<td>19</td>
<td>13</td>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>

Note: The numbers in parenthesis are "t" ratios.
As for the agricultural countries, a higher degree of food production is associated with a lower overall performance of the agricultural sector and with higher food imports. In part these correlations reflect the fact that the countries where food production has to be stressed are also the ones that may profit less from specialization and/or that may find themselves in the double bind of having both to produce and import more food because of a large and growing population. These interpretations are confirmed by the significance and the size of the positive effect of the population growth and the population size variables and by the equations estimated for total GDP (right-hand panel of Table 4). For the GDP growth variables, two sets of multiple correlations were considered. In the first set, the differences in performance of the countries were compared with the share variables (composition of trade, labor force and total GDP), while in the second set the same differences were related to literacy rates and demographic variables. As for all the results presented, the parameters estimated are affected by simultaneous equation bias and should be interpreted only as broad indicators of statistical association.

For the non-agricultural countries, only the first set of regressions gave statistically significant results. For these countries a higher level of per capita food production and a higher share of agricultural GDP are associated, as expected, with lower overall economic performance. Once these effects are taken into account, however, countries with a larger fraction of their labor force in agriculture show higher growth rates than other countries with comparable characteristics.
For the same type of regression, the results for agricultural countries conform to the general pattern of structural change discussed in most of the empirical literature. In particular, countries with higher agricultural sector shares and a higher proportion of the labor force in agriculture do appear to have lower growth rates than comparable countries. Furthermore, countries whose agricultural sector is relatively less important in terms of trade shares (of exports and imports) and per capita food production fare also better in terms of overall growth rates.

While the second type of multiple correlation tests (column B of Table 9), did not show a significant association between growth performance and population growth rate, population size and literacy rates display significant and, in the case of population growth, large correlations with GDP growth. The negative correlation of population growth is particularly impressive and suggests that countries with comparable education and labor force characteristics may be distinctly handicapped by lack of family planning and/or policies for population control.

If we again interpret the grouping of the countries considered as representing two consecutive stages of economic development, the above findings can be summarized as follows. In a first development stage, countries whose industrial sector is not sufficiently developed to create a market for domestic food products and countries whose comparative advantage in food production is particularly low, display a negative correlation between (i) industrial and agricultural growth, (ii) food production and agricultural growth, and (iii) overall GDP growth and all indicators of relative size of the agricultural sector. This negative correlation is further reinforced by the fact that population growth tends to shift resources from the sectors where the country may have comparative advantage in food production. Finally, agricultural
overall GDP growth are strongly affected by the degree of literacy of the population — a clear indication of the importance of human capital investment in the initial stages of development.

For the most developed non-agricultural countries, on the other hand, the process of differentiation of the economy is sufficiently advanced to permit labor absorption from the agricultural into the industrial sector maintaining, at the same time, an appropriate balance between agriculture and non-agriculture. In these countries, complementarity between the agricultural sector and manufacturing industry may be high, inter alia, because of historical emphasis on agricultural growth even when the economy was at the earlier stages of development. As a consequence, equilibrium between agriculture and non-agriculture is easier to maintain and development proceeds along a broad front involving trade, food production, industrialization and population.

In conclusion, it should first of all be pointed out that the evidence examined so far is based entirely on cross section data and limited to a few data points. However, the quantitative results presented here tend to confirm the hypothesis that a model of development based on balanced growth holds the key for achievement of successful overall economic performance as well as for the development of both the agricultural and non-agricultural sectors. It should also be stressed that cross section data can also be used to formally reject the opposite hypothesis, and in particular, any postulated negative trade-off between agricultural and industrial growth for the predominantly non-agricultural countries.
4. GROWTH, BASIC NEEDS AND SOCIAL PROGRESS.

In the first section of the paper reference was made to several studies which dramatize the possible divergence between the attainment of fast economic growth and wider socio-economic goals. In addition, the discussion contained in the previous section highlights the fact that performance comparisons and structural indicators should consider not only sector growth rates, production, trade and other standard economic variables, but also less conventional measures of development. Most studies which address this question utilize indices of poverty alleviation, income inequality and distribution, and the like. However, we take a slightly different approach by concentrating on indicators of the provision of basic needs.

While the statistical evidence on the basic needs profile of countries is scarce, the historical data pertaining to the experience of middle income countries is sufficient in most cases to enable us to compute three basic indicators of well-being — life expectancy, infant mortality and literacy rates. 19/ These indicators are closely related to income distribution and poverty alleviation. While they represent only a limited aspect of basic needs, they nevertheless provide a significant picture of respective country performances in achieving some basic characteristics of social well-being.

19/ See M. McLaughlin and Staff of the Overseas Development Council. The United States and World Development, Agenda 1979 (New York: Praeger Publishers, 1979) especially pp. 132-133 for a summary of the main reasons why these three variables can be considered good indicators of important aspects of social progress.
Table 10 presents data for a subsample of 21 middle income countries for which life expectancy, infant mortality and literacy rates are available. In addition to the individual values of the indicators, two combined indices are reported. The first one, the Physical Quality of Life Index (PQLI) is derived by indexing the three indicators on a scale of 0 (the most unfavorable performance in 1950) to 100 (the best performance expected by the end of the century) and taking an arithmetic average. The second one, the Disparity Reduction Rate (DDR) is defined as the rate at which a country's disparity between performance in PQLI at any one time and the best expected performance in the year 2000 is being reduced.

Before systematically relating the information presented in this table with the indicators of economic performance and structural changes, several observations are in order. First, in a significant number of cases a good standing in either of the indices (or their combination) is related to the past performance of the country in reducing the gap between present conditions and social standards. Second, with few exceptions a good performance in improving the combined social indicators is associated with a relatively smaller agricultural sector. Conversely, poor base year conditions and poor social performances are typically associated with a relatively more export dependent agricultural sector.
**Table 10: INDICATORS OF SOCIAL PROGRESS IN MIDDLE INCOME COUNTRIES**

<table>
<thead>
<tr>
<th>Country</th>
<th>Life Expectancy at Birth</th>
<th>Infant Mortality</th>
<th>Literacy%</th>
<th>POLI %</th>
<th>DDR %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombia</td>
<td>61</td>
<td>90</td>
<td>81</td>
<td>72</td>
<td>9.7</td>
</tr>
<tr>
<td>Korea</td>
<td>61</td>
<td>70</td>
<td>85</td>
<td>82</td>
<td>5.0</td>
</tr>
<tr>
<td>Mauritania</td>
<td>39</td>
<td>187</td>
<td>11</td>
<td>18</td>
<td>0.4</td>
</tr>
<tr>
<td>Morocco</td>
<td>53</td>
<td>133</td>
<td>21</td>
<td>40</td>
<td>1.5</td>
</tr>
<tr>
<td>Philippines</td>
<td>65</td>
<td>47</td>
<td>88</td>
<td>71</td>
<td>3.3</td>
</tr>
<tr>
<td>Thailand</td>
<td>61</td>
<td>89</td>
<td>79</td>
<td>71</td>
<td>0.6</td>
</tr>
<tr>
<td>Algeria</td>
<td>53</td>
<td>145</td>
<td>26</td>
<td>41</td>
<td>1.4</td>
</tr>
<tr>
<td>Brazil</td>
<td>61</td>
<td>109</td>
<td>66</td>
<td>66</td>
<td>0.8</td>
</tr>
<tr>
<td>Chile</td>
<td>63</td>
<td>56</td>
<td>88</td>
<td>79</td>
<td>4.1</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>68</td>
<td>38</td>
<td>89</td>
<td>85</td>
<td>4.4</td>
</tr>
<tr>
<td>Dom. Republic</td>
<td>70</td>
<td>27</td>
<td>78</td>
<td>64</td>
<td>0.2</td>
</tr>
<tr>
<td>Iran</td>
<td>66</td>
<td>47</td>
<td>78</td>
<td>52</td>
<td>2.3</td>
</tr>
<tr>
<td>Jamaica</td>
<td>65</td>
<td>35</td>
<td>83</td>
<td>85</td>
<td>3.1</td>
</tr>
<tr>
<td>Malaysia</td>
<td>68</td>
<td>41</td>
<td>53</td>
<td>73</td>
<td>4.6</td>
</tr>
<tr>
<td>Mexico</td>
<td>68</td>
<td>20</td>
<td>82</td>
<td>75</td>
<td>1.8</td>
</tr>
<tr>
<td>Peru</td>
<td>56</td>
<td>80</td>
<td>72</td>
<td>65</td>
<td>2.1</td>
</tr>
<tr>
<td>Romania</td>
<td>70</td>
<td>31</td>
<td>38</td>
<td>91</td>
<td>4.8</td>
</tr>
<tr>
<td>Taiwan</td>
<td>70</td>
<td>25</td>
<td>85</td>
<td>87</td>
<td>5.2</td>
</tr>
<tr>
<td>Tunisia</td>
<td>55</td>
<td>135</td>
<td>32</td>
<td>46</td>
<td>1.6</td>
</tr>
<tr>
<td>Turkey</td>
<td>57</td>
<td>119</td>
<td>51</td>
<td>56</td>
<td>2.1</td>
</tr>
<tr>
<td>Yugoslavia</td>
<td>68</td>
<td>36</td>
<td>84</td>
<td>84</td>
<td>4.6</td>
</tr>
</tbody>
</table>

---

1/ Years


3/ Literacy data are the latest estimates available and generally represent the proportion of the adult population (15 years and older) able to read and write.

If the countries with the best achievements in quality of life attainment are grouped by continent, it seems that the PQLI largely reflects the relative balance between the agricultural and non-agricultural sectors. For example, in the Asian content, Korea and Taiwan recorded the highest levels, with PQLI scores of 82 and 87 respectively. It is of some interest that these countries have followed a more balanced, centrally-guided development path. By contrast, both the Philippines and Taiwan attained the lowest continental PQLI scores of 71. While these two countries have placed some degree of emphasis on balanced growth, their economies have not been as closely monitored or centrally-guided. Malaysia with a PQLI score of 73 in many respects represents an intermediate case in terms of growth policies and economic management. Both Africa, Europe and the Middle East on the one hand, and Latin American on the other, show similar patterns. In the African case the prototype of unbalanced growth and poor basic needs performance is Algeria, while in Latin America a similar position is taken by Brazil.

A multivariate analysis of the differences in the quality of life indices shows that these indicators display significant statistical association with selected economic and demographic structural indices. Table 11 and 12 report a first set of simple and multiple correlations, respectively, for a sample of 29 middle income countries for which the basic QLI indices are available. Aside from the literacy rate variable, which shows itself as a good proxy for the other QLI variables (being highly correlated with all), the highest simple and partial correlations occur between the social indicators and the percentage of labor force in agriculture. However, while this statistical association is strong, the effect of the decrease of relative size of the agricultural sector on the level of the social variables appears to be small.
<table>
<thead>
<tr>
<th></th>
<th>LFEXP&lt;sup&gt;1/&lt;/sup&gt;</th>
<th>DEATHRT&lt;sup&gt;2/&lt;/sup&gt;</th>
<th>INF MORT&lt;sup&gt;1/&lt;/sup&gt;</th>
<th>LITER</th>
<th>PQLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>LITER</td>
<td>0.897</td>
<td>-0.913</td>
<td>-0.858</td>
<td>1.00</td>
<td>0.951</td>
</tr>
<tr>
<td>GRPOP</td>
<td>-0.260</td>
<td>0.131</td>
<td>0.301</td>
<td>-0.119</td>
<td>-0.234</td>
</tr>
<tr>
<td>POP</td>
<td>0.146</td>
<td>-0.254</td>
<td>0.025</td>
<td>0.204</td>
<td>0.173</td>
</tr>
<tr>
<td>PCFOOD</td>
<td>0.367</td>
<td>-0.367</td>
<td>-0.301</td>
<td>0.172</td>
<td>0.313</td>
</tr>
<tr>
<td>AGR LAB</td>
<td>-0.783</td>
<td>0.737</td>
<td>0.794</td>
<td>-0.687</td>
<td>-0.744</td>
</tr>
<tr>
<td>GCRDP</td>
<td>0.437</td>
<td>-0.524</td>
<td>-0.238</td>
<td>0.397</td>
<td>0.380</td>
</tr>
<tr>
<td>GCRGR</td>
<td>-0.251</td>
<td>0.170</td>
<td>0.402</td>
<td>-0.199</td>
<td>-0.255</td>
</tr>
</tbody>
</table>

1/ Variable LFEXP and INF MORT denote respectively life expectancy at birth and infant mortality as described in Table 11. All other variables except DEATHRT are defined as in Table 7.

2/ DEATHRT is the death rate in per thousand.
As an illustration, it can be concluded from the regression results presented in Table 12 that, ceterius paribus, a decrease by one per cent in the proportion of the labor force in agriculture is associated, on average, with an increase of only 0.12 years in life expectancy, and a decrease of 0.8 deaths per thousand in the infant mortality rate. By comparison, the population growth variable appears to make much more difference in accounting for the base year differences in social performance, even if account is taken of the fact that the range of variation of this variable is very small.

Among the agricultural variables, in addition to the relative size of the agricultural sector, the index of per capita food production is also positively correlated with all the quality of life indices. In practice, this variable tends to counteract the effect of the proportion of the labor force variable for those countries where a still relatively large agricultural sector is justified in order to provide food for a growing population. Finally, it is interesting to notice that while the GDP growth rate appears to have a relatively large and significant effect on the differences in infant mortality rates, its correlation with the other variables is small and insignificant. 20/.

Table 13 presents information in country performance in achieving social targets in terms of a multiple correlation between Disparity Reduction Rates (DRRs) and selected social and demographic variables. The results of the correlations are only in fact similar to the ones previously observed for base year indicators. First, for the majority of variables, achievements

\[ \text{PQLI} = 70.432 - 0.816 \text{AGRFLAR} + 0.424 \text{PCFOOD} - 0.0020(\text{AGREXP})^2 + 1.601 \text{GRAGR} - 0.314(\text{GRAGR})^2 \]
\[
\text{R}^2 = 0.733
\]
Table 11: MULTIPLE CORRELATION BETWEEN SELECTED INDICATORS OF SOCIAL PROGRESS, AND ECONOMIC AND DEMOGRAPHIC VARIABLES

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>LFE XP</th>
<th>DEATHRT</th>
<th>INF MORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>48.303</td>
<td>23.329</td>
<td>72.142</td>
</tr>
<tr>
<td>LITER</td>
<td>8.226</td>
<td>-0.139</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(7.79)</td>
<td>(7.32)</td>
<td></td>
</tr>
<tr>
<td>(LITER)²</td>
<td>-</td>
<td>-</td>
<td>-0.0104</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(7.32)</td>
</tr>
<tr>
<td>GRPOP</td>
<td>-1.837</td>
<td>-</td>
<td>10,430</td>
</tr>
<tr>
<td></td>
<td>(2.37)</td>
<td></td>
<td>(2.56)</td>
</tr>
<tr>
<td>POP</td>
<td></td>
<td>-0.024</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.50)</td>
<td></td>
</tr>
<tr>
<td>PC FOOD</td>
<td>0.067</td>
<td>-0.043</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.05)</td>
<td>(3.31)</td>
<td></td>
</tr>
<tr>
<td>(PC FOOD)²</td>
<td>-</td>
<td>-</td>
<td>0.0013</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.79)</td>
</tr>
<tr>
<td>AGR L AB</td>
<td>-0.1205</td>
<td>-</td>
<td>0.779</td>
</tr>
<tr>
<td></td>
<td>(3.26)</td>
<td></td>
<td>(4.14)</td>
</tr>
<tr>
<td>(AGR L AB)²</td>
<td>-</td>
<td>0.00054</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.35)</td>
<td></td>
</tr>
<tr>
<td>GR GDP</td>
<td>-</td>
<td>-</td>
<td>0.244</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(2.10)</td>
</tr>
<tr>
<td>(GR GDP)²</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.913</td>
<td>0.905</td>
<td>0.906</td>
</tr>
<tr>
<td>Observations</td>
<td>29</td>
<td>29</td>
<td>29</td>
</tr>
</tbody>
</table>

¹/ The numbers in parenthesis are "r" ratios.
<table>
<thead>
<tr>
<th>Variable</th>
<th>POLI</th>
<th>LITER</th>
<th>LEXP</th>
<th>INFEMORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>7.957</td>
<td>7.130</td>
<td>4.091</td>
<td>-</td>
</tr>
<tr>
<td>AGRLAB</td>
<td>-0.207</td>
<td>-0.361</td>
<td>-0.017</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(2.09)</td>
<td>(2.17)</td>
<td>(1.44)</td>
<td></td>
</tr>
<tr>
<td>(AGRLAB)^2</td>
<td>0.0015</td>
<td>0.0026</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(1.72)</td>
<td>(2.00)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>AGRDP</td>
<td>0.229</td>
<td>0.218</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(1.67)</td>
<td>(1.06)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(AGRDP)^2</td>
<td>-0.0039</td>
<td>-0.0033</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(1.78)</td>
<td>(0.69)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PCFOOD</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.062</td>
</tr>
<tr>
<td>(PCFOOD)^2</td>
<td>0.00021</td>
<td>0.00025</td>
<td>-</td>
<td>(2.30)</td>
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<td></td>
<td>(3.00)</td>
<td>(2.08)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>AGREXP</td>
<td>-0.197</td>
<td>-</td>
<td>-0.00018</td>
<td>-0.144</td>
</tr>
<tr>
<td></td>
<td>(3.28)</td>
<td>-</td>
<td>(2.25)</td>
<td>(2.06)</td>
</tr>
<tr>
<td>(AGREXP)^2</td>
<td>0.0148</td>
<td>-</td>
<td>-</td>
<td>0.00094</td>
</tr>
<tr>
<td></td>
<td>(2.90)</td>
<td>-</td>
<td>-</td>
<td>(1.49)</td>
</tr>
<tr>
<td>GRAGR</td>
<td>0.480</td>
<td>0.730</td>
<td>0.438</td>
<td>0.334</td>
</tr>
<tr>
<td></td>
<td>(2.18)</td>
<td>(2.14)</td>
<td>(3.56)</td>
<td>(1.66)</td>
</tr>
<tr>
<td>(GRAGR)^2</td>
<td>-0.072</td>
<td>-0.089</td>
<td>0.042</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(3.60)</td>
<td>(2.87)</td>
<td>(4.30)</td>
<td></td>
</tr>
<tr>
<td>GRIND</td>
<td>-</td>
<td>0.022</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>(GRIND)^2</td>
<td>-</td>
<td>-</td>
<td>(6.67)</td>
<td></td>
</tr>
<tr>
<td>POP</td>
<td>-</td>
<td>-</td>
<td>-0.056</td>
<td></td>
</tr>
<tr>
<td>(POP)^2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(3.29)</td>
</tr>
<tr>
<td>GRPOP</td>
<td>-</td>
<td>-</td>
<td>-4.190</td>
<td>-</td>
</tr>
<tr>
<td>(GRPOP)^2</td>
<td>-</td>
<td>-</td>
<td>(-1.24)</td>
<td>-</td>
</tr>
<tr>
<td>LITER</td>
<td>-</td>
<td>-</td>
<td>-0.079</td>
<td>-</td>
</tr>
<tr>
<td>(LITER)^2</td>
<td>-</td>
<td>-</td>
<td>0.00103</td>
<td>-</td>
</tr>
<tr>
<td>R^2</td>
<td>0.853</td>
<td>0.667</td>
<td>0.954</td>
<td>0.741</td>
</tr>
<tr>
<td>Observations</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>
achievements in quality of life are positively correlated with growth achievements in agriculture. Second, there appears to be a strong negative correlation between population growth and country success in increasing life expectancy. Third, there is a positive relationship between the achievements of higher social progress, the relative size of the agricultural sector and the amount of per capita food production, while the share of primary exports displays a negative relationship.

In conclusion, it should be emphasized that the entire set of correlation results are merely indicative of cause-effect patterns and are not presented as formal or rigorous tests of specific hypotheses on the relationship between economic structure, performance and the attainment of social progress. However, the following decisive conclusions can be drawn from the strong statistical patterns displayed: (i) there are large and definite trade-offs between economic growth and the attainment of broader social goals, in other words, in between "growth" and "development" and (ii) while the initial conditions may tend to favor countries which are less dependent on the agricultural sector, success in pursuing social goals may redound to these countries which pursue a more balanced, if slower, growth path.
5. CONCLUSIONS

Middle income countries represent a diverse sample of economic conditions and development experience. They include both poor and relatively rich countries and a variety of success and failure stories in increasing food output, export crops, developing domestic industries and expanding trade. By and large, their patterns of growth differ from the experience of the developed countries during the early phase of their development in that agricultural production and trade is originally less diversified, self-reliance for food consumption lower and industrialization somewhat costlier and less dynamic. Despite these differences, some universal patterns of change can be observed from the experience of all countries and include: a declining share of agriculture in total output with a concomitant increase in the share of manufactures; a shift in the labor force from agriculture and other primary industries where its productivity is low, to secondary and tertiary activities where it is higher; and changes in the patterns of external trade in agriculture with diversification in domestic production and a reduction in food exports.

These differences, however, cannot be related to the prescription of a correct path of development and there is general agreement that development and industrialization and, indeed growth and development, cannot be seen as synonymous. While it seems clear that agriculture's role in structural transformation is inherently connected to the sector's role in the overall development process, the traditional focus on growth and accumulation is not necessarily appropriate. At the minimum, development implies the attainment of a set of
social goals such as (i) the provision of basic needs to everyone, (ii) an equitable income distribution, and (iii) a better quality of life. These objectives involve both growth-distribution and efficiency-equity considerations. In general, they do not stand in contrast with the objective of increasing agricultural productivity, the point of convergence being the institutional structure of society which must be altered through the adoption of suitable policies and strategies.

The examination of alternative hypotheses and the available evidence on structural transformation point to the following tentative conclusions.

First, countries whose industrial sector is not sufficiently developed to create a market for domestic food products, and countries whose comparative advantage in food production is low or negative, appear to face a choice between balanced but slower growth both between and within the sector and unbalanced but faster growth. This result comes from a comparison of the countries pattern of growth in the mid-1970's which, for predominantly agricultural countries, display a negative correlation between (i) industrial and agricultural growth, (ii) food production and agricultural growth, and (iii) overall GDP growth and all indicators of relative size of the agricultural sector. This negative correlation is further reinforced by the fact that population growth tends to shift resources from the sectors where the country may have comparative advantage to food production.

Second, for the most successful non-agricultural countries, the process of differentiation of the economy is sufficiently advanced to permit labor absorption from the agricultural into the industrial sector maintaining, at the same time, an adequate balance between agriculture and non-agriculture. In these
countries, complementarity between the agricultural sector and the manufacturing industry may be high, inter alia, because of historical emphasis on agricultural growth since the earlier stages of development. As a consequence, development proceeds along a broad front, involving trade, food production, industrialization and population.

Third, for both predominantly agricultural and non-agricultural economies, the pursuit of balanced growth between agriculture and manufacturing and within agriculture between food and non-food is associated with the higher achievements in terms of ensuring the satisfaction of basic needs, improving the conditions of the poor and bettering the quality of life for all. Furthermore, the worst conditions of life are found in those countries where the push to industrialize at the expense of agricultural development and growth in food production is highest.
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