THE SECTORAL DISTRIBUTION OF EMPLOYMENT AND THE LEVEL OF ECONOMIC DEVELOPMENT

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It is a lesson of economic history that the industrialisation of the new developed countries was accompanied by large scale movements of labour from the Primary sector (Agriculture and Mining) to the Secondary (Manufacturing and Construction) and Tertiary sectors (Utilities, Commerce, Transportation and Services). Similar largescale shifts of labour are taking place in the course of the industrialisation of today's underdeveloped countries. It would appear sensible, some might say trite, to suppose that these changes in the distribution of labour between sectors are related to changing levels of economic development, that is, in terms of the most common measuring yardstick, changes in Gross Domestic Product per capita.

For our purposes, this is a convenient measure of economic development, because it is relatively easy to *forecast*. If we could find some simple equations to describe the relationships between the proportions of the population employed in each sector and the level of per capita GDP, we could use often-available information about expected or planned per capita GDP levels to forecast in which economic activities the labour force is likely to be employed. It is useful to know this because a number of problems are directly related to the distribution of the labour force between economic activities. Cities, for example, tend to grow proportionately to the numbers employed in the Secondary and Tertiary Sectors. Employment opportunities in Manufacturing, which remains the key sector in industrialisation, will determine to a large extent whether the movement of immigrants into the cities will be absorbed into productive jobs or not. The occupational structure and the demands by the economy placed

on the educational system will be partly determined by the distribution of jobs between economic activities, and so on.

In this paper, we have attempted to formulate a few such simple mathematical relationships between sectoral employment and levels of economic development, and have tested the statistical significance of these relationships.

The dependent variable chosen was the ratio L_i/P, where L_i is employment in economic sector i, and P is total population. The independent variable chosen was per capita GDP (Y/P), although in the last section some additional explanatory variables have been added, such as per capita investment (K/P), per capita exports of manufacturing products (E_m/P) and of primary products (E_p/P), and total population itself, P.

The equations are all in log-linear form. For example, the relationships between L_i/P and Y/P are expressed as

$$\log L_i/P = a_i + b_i \log Y/P \qquad [1]$$

Log-linear form was chosen because it appeared to be appropriate and gave the best fit in very similar studies (1).

Estimation of the coefficients of the equations was based on regression analysis of cross-sectional data : to estimate the b-coefficients of equations [1] above, for example, we collected statistics on sectoral employment and per capita income for a large number of countries and treated the country data as observed values of L_i/L and Y/P.

In the following sections the results of these regression analyses are explained and discussed.

1. THE RELATIONSHIPS BETWEEN SECTORAL DISTRIBUTION OF EMPLOYMENT AND PER CAPITA INCOME.

Table 1 presents the results of the regression analysis with the log-linear equations $\log L_i/P = a_i + b_i \log Y/P$, where i indicates the economic sector concerned and ranges from 1 to 8.

(1) We refer to H.B. CHENERY's studies on the sectoral distribution of output and a study by the OECD on the occupational and educational structure of the labour force. Chenery's studies are discussed further in this paper, the OECD-study is discussed by L. EMMERIJ, in a subsequent paper of this volume.

TABLE 1 : Results of the regression analysis relating sectoral employment L_i/P to per capita income Y/P : $\log L_i/P = a_i + b_i \log Y/P$.

Sector	b-coefficient and standard error	R^2
(1) Agriculture	-0.534 (0.053)	0.609
(2) Mining	0.920 (0.277)	0.237
(3) Manufacturing	0.601 (0.061)	0.609
(4) Construction	0.674 (0.042)	0.711
(5) Utilities	0.361 (0.088)	0.241
(6) Commerce	0.530 (0.046)	0.674
(7) Transport	0.584 (0.055)	0.634
(8) Services	0.483 (0.050)	0.578

Except for the sector Mining, the results are statistically significant at the one per cent level : the standard errors are low and the coefficients of determination are in almost all cases above 0.600, which is satisfactory. The number of countries included in the sample was 68. A full listing of the basic date is given in Table A of Appendix A.

The b-coefficients represent the elasticities of L_i/P with respect to per capita income : the percentage change in L_i/P per unit percentage change in Y/P. To give an example : the b-coefficient of the equation $\log L/P = a + 0.60 \log Y/P$, pertaining to the Manufacturing sector (3), implies that a one per cent

increase in per capita income results in a 0.6 per cent increase in the proportion of the population employed in manufacturing.

The equations [1] can also be written in the form of growth rates : if l is the (compound) rate of growth of employment in sector i, p the growth rate of population and y the growth rate of GDP, then equations [1] imply that

$$l - p = b_i (y - p)$$

or

$$l = b_i y - (1 - b_i)p \quad [2]$$

Writing, for example, the log-linear equation referring to the Manufacturing sector in this form, we obtain the equation,

$$l_3 = 0.60y + 0.40p,$$

telling us that the rate of growth of employment in manufacturing is equal to 0.6 times the growth rate of output plus 0.4 times the growth rate of population.

2. EMPLOYMENT FORECASTS BASED ON THE ESTIMATED ELASTICITIES : AN ILLUSTRATIVE EXAMPLE WITH LATIN AMERICAN DATA

In this section, the regression coefficients obtained in Table 1, have been used to project 1960 employment data into 1970. The 1960 employment data refer to the Latin American continent and constitute rough estimates collected by the Economic Commission for Latin America. In this illustrative example, the target rate of growth of GDP is assumed to be 4.5 per cent per annum, and the expected rate of growth of population 2.5 per cent per annum.

The object of this exercise is threefold : first, to illustrate how sectoral employment forecasts can be derived on the basis of planned y and expected p; second, to discuss the margins of error involved in the forecasts; third, to see how *total* employment develops given the assumptions made with respect to y and p and given the sectoral elasticity coefficients b_i.

The calculating procedure can be followed from Table 2. Column (1) presents the employment data for the base year 1960. The sectoral elasticities b_i in column (2) have been taken from

TABLE 2 : Forecast of employment growth in Latin America between 1960 and 1970. y = 4.5, p = 2.5.

	(1) Employment in 1960 (in millions)	(2) Elasticities	(3) Growth rate of employment (% p.a.)	(4) Index of increase in employment 1960-70	(5) Employment in 1970 (in millions)	(6) Confidence limits of the forecasts		Percentage deviation between forecast and upper confidence limit (in %)
						upper limit	lower limit	
(1) Agriculture	26.60	-0,534	1.43	115	30.59	31.39	29.80	2.6
(2) Mining	0.60	0.920	4.34	153	0.92	1.01	0.82	9.7
(3) Manufacturing	9.37	0.601	3.70	144	13.49	13.87	13.21	2.8
(4) Construction	3.19	0.674	3.86	146	4.66	4.72	4.59	1.3
(5) Utilities	0.70	0.361	3.22	137	0.96	0.99	0.93	3.1
(6) Commerce	5.80	0.530	3.56	142	8.24	8.41	8.06	2.1
(7) Transportation	2.69	0.584	3.67	143	3.85	3.92	3.79	1.8
(8) Services	10.00	0.484	3.47	141	14.05	14.30	13.80	1.4
Total employment	58.95	(0.240)	(2.74)	130	76.76	78.61	75.00	2.4
Total labour force	65.95							
Population	199.10							

Table 1. Knowing the b-coefficients and the values of y and p, the growth rates of sectoral employment can be derived by the equations.

$$l_i = b_i y + (1 - b_i)p \qquad [2]$$

These sectoral employment growth rates are in column (3). Column (4) gives the corresponding indices of employment increase over a ten-year period. Multiplying the base year data of column (1) through these indices, provides us the employment forecasts for 1970, which are in column (5). Column (6) gives the upper and lower confidence limits for a 0.95 per cent confidence interval.

First a word on the confidence limits. The confidence limits give the extremes between which actual employment in 1970 is likely to be situated given our assumed rates of growth of GDP and population. That is, there are 95 chances out of 100 that agricultural employment in 1970 will be between 29.8 and 31.4

million, while the most probable number is 30.6 million, if the target rate of growth of GDP is achieved and population grows as expected. It can be seen that, except for the sector Mining, the confidence interval is quite narrow. One cannot rely too much on these confidence limits, however, for the following reasons. First, our assumed growth rates of GDP and population may easily be wrong. Second, the forecast is concerned with changes over time, while the estimation of the elasticity coefficients is based on cross-sectional data. Applying cross-section derived estimates to the projection of time-series involves an error factor, the importance of which we are unable to determine.

Finally, a few words should be said about the forecast of *total* employment. If the sectoral employment forecasts of column (5) are added up, one obtains a total of 76.76 million employed for 1970. This forecast implies a growth rate of total employment of 2.74 per cent per annum and an employment elasticity of 0.240. Two things should be observed. First, the forecast of employment cannot be regarded as a projection of future *demand*. The reason for this is that basic employment data, on which the estimation of the elasticities is based, do not reflect demand but equilibria between supply and demand. Hence, the forecasts made by means of these elasticities must also reflect not the demand for labour but equilibria between supply and demand. Second, it is worthwhile noticing that the growth rate of total employment is a weighted average of sectoral growth rates, with the sectoral employment data of the base year as weights. Accordingly, the overall growth rate of employment and the corresponding elasticity will vary according to the sectoral distribution of employment in the base year. Since Agriculture has a big (employment) base year weight, and since Agricultural employment is expected to grow slowly, total employment grows more slowly than in any of the non-Agricultural sectors, and much more slowly than in Manufacturing.

3. SECTORAL PRODUCTIVITIES AND LEVELS OF PER CAPITA INCOME

In his celebrated article, "Patterns of industrial growth", H. B. CHENERY (1) analysed the relationships between distribution of output on the one hand, and per capita income and country size, on the other hand. When the size variable is deleted from the Chenery model (2), the regression equations constituting his model can be written as :

$$\log Y_i/P = a_i + c_i \log Y/P \qquad [3]$$

where the variable Y_i refers to output in sector i, P is population and Y is GDP. The formal structure of the regression equations [1] presented in the first section of this paper is identical to the form of the equations [3] above, the only difference being that our analysis deals with sectoral employment, L_i, while CHENERY's model deals with sectoral output, Y_i. Estimation of the elasticities in CHENERY's model was also based on cross-sectional data. Except for differences in sector classification and sample composition, the elasticities in our analysis are directly comparable with the elasticities in CHENERY's model, the coefficients in CHENERY's model representing elasticities of output with respect to per capita income, with our b-coefficients referring to the corresponding employment elasticities. Table 3 presents in column (1) the output elasticities as derived from CHENERY's model, while column (2) gives the corresponding employment elasticities.

The most interesting piece of information of Table 3 is contained in column (3). The coefficients in that column are "elasticities of productivity" and have been obtained by subtracting the employment elasticities from the production elasticities (3). The productivity elasticities d_i indicate the rate of

(1) H. B. CHENERY : „Patterns of industrial growth", *American Economic Review*, September 1960.

(2) Since the size variable in CHENERY's model is only significantly different from zero for the manufacturing sector, not much harm is done to the model by deleting that variable.

(3) The elasticities of productivity with respect to per capita income are by definition equal to the d-coefficients in the equations.

$$\log Y - \log L_i = \text{constant} + d_i \log Y/P$$

TABLE 3 : Comparison of output and employment elasticities. Calculation of elasticities of productivity.

Sector	(1) Output elasticities, c_i	(2) Employment elasticities, b_i	(3)=(1)—(2) Elasticities of productivity, d_i
Agriculture	0.474	–0.534	1.008
Mining	0.935	0.920	0.015
Manufacturing	1.441	0.601	0.840
Construction	1.152	0.674	0.478
Transportation	1.288	0.584	0.704
Other Tertiary Activities	1.066	0.495*	0.571

(*) The employment elasticity 0.495 for the sector „Other Tertiary Activities'" is a weighted average of the elasticities for Utilities. Commerce and Services with the 1960 employment data of Latin America as weights. Altering the weights would slightly change the employment elasticity concerned.

change in productivity of sector i per unit rate of change in per capita income.

Sector-by-sector comparison of these elasticities of productivity leads to the following conclusions. As levels of economic development rise, productivity gains are largest in the Agricultural sector : a 1 % increase in per capita GDP is accompanied by a 1 % increase in agricultural productivity. Next comes the Manufacturing sector with an elasticity coefficient of 0.840. Productivity increases are relatively moderate in the sectors Transportation and Other Tertiary Activities and low in the Construction sector. Little importance should be attached to the very low productivity elasticity for the sector Mining, because the estimates of both employment and production elasticities in this sector are unreliable.

Subtracting the equations [2]

$$\log L_i - \log P = a_i + b_i \log Y/P$$

from the corresponding equations (3)

$$\log Y_i - \log P = a_i + c_i \log Y/P$$

yields

$$\log Y_i - \log L_i = \text{Constant} + (c_i - b_i) \log Y/P$$

Hence,

$$d_i = c_i - b_i$$

4. THE INTRODUCTION OF ADDITIONAL EXPLANATORY VARIABLES

In 1968 CHENERY and TAYLOR published the results of a second and more extensive study on the sectoral distribution of output (1). The second study differs from the first, mainly in three respects. First, time-series data were pooled together with cross-sectional data, which increased considerably the number of observations in the sample. Second, the countries were split into three groups : large countries, small industry-oriented countries, and small primary-oriented countries. Third, the number of explanatory variables was increased from two to six : the variables used in the first study were log Y/P and log P; the additional variables included in the second study were $(\log Y/P)^2$, log K/P, log E_m/P and log E_p/P, where K stands for investment, E_m for exports of manufactured goods and E_p for exports of primary products.

An extensive regression analysis of the same nature could be performed on employment data. We did not attempt such an extensive study, however, *inter alia* because the collection of time-series data on sectoral employment would have involved a search for additional data beyond our resources of time and energy. We did, however, perform some multiple regression analysis to check whether the inclusion of additional explanatory variables would substantially improve the results of the single regression presented in section 1 of this paper. The procedure followed was simple : we sorted out those countries for which CHENERY and TAYLOR's study provided data on K/P, E_m/P and E_p/P and for which our own data were available on the sectoral distribution of employment. The sample thus obtained included 40 countries, which are listed in Appendix B. On the basis of this limited sample, we performed multiple regressions with log Y/P, log P, log K/P, log E_m/P and log E_p/P as explanatory variables.

The variable $(\log Y/P)^2$ was tried out, but finally deleted for two reasons : first, $(\log Y/P)^2$ is strongly interrelated with log Y/P; second, even in long term projections, the expected or

(1) H. B. CHENERY and L. TAYLOR : „Development Patterns : Among Countries and Over Time", *Review of Economics and Statistics*, November 1968.

planned increase in Y/P is so moderate that the growth elasticity of employment with respect to per capita income remains practically unaffected by the adjustment factor $(\log Y/P)^2$.

The multiple regression analyses were performed on three aggregated sectors : a Primary sector (Agriculture and Mining), a Secondary sector (Manufacturing and Construction) and a Tertiary sector (Utilities, Commerce, Transportation and Services).

TABLE 4 : Multiple regression analysis with log Y/P, log P, log E_m/P and log E_p/P as explanatory variables (Sample of 40 countries).

Explanatory variables included	Regression coefficients of					R^2
	log Y/P	log P	log K/P	log E_m/P	log Ep/P	
Primary Sector						
log Y/P	-0.606					0.796
	(0.050)					
log Y/P and log P	-0.606	-0.067				0.814
	(0.048)	(0.036)				
All variables	-0.620	-0.072	0.190	-0.017	-0.048	0.822
	(0.074)	(0.048)	(0.183)	(0.065)	(0.090)	
Secondary Sector						
log Y/P	0.565					0.689
	(0.062)					
log Y/P and log E_m/P	0.307			0.269		0.817
	(0.070)			(0.053)		
log Y/P, log E_m/P and log E_p/P	0.235			0.225	-0.112	0.833
	(0.068)			(0.056)	(0.061)	
All variables	0.305	-0.013	0.234	0.202	-0.152	
	(0.070)	(0.046)	(0.167)	(0.059)	(0.081)	0.842
Tertiary Sector						
log Y/P	0.458					0.738
	(0.044)					
log Y/P and log E_m/P	0.374			0.088		0.763
	(0.062)					
log Y/P, log E_m/P and log E_p/P	0.387			0.057	-0.077	0.773
	(0.062)			(0.051)	(0.055)	
All variables	0.388	0.014	0.002	0.058	-0.062	0.773
	(0.065)	(0.042)	(0.042)	(0.053)	(0.073)	

The results of these multiple regression analyses are presented in Table 4. The presentation of the equations in Table 4 follows the form of a step-wise regression analysis : we start with the explanatory variable log Y/P and add, one by one, those additional variables which prove to increase significantly the coefficient of determination. The last equation for each sector includes all explanatory variables, whether significant or not.

Before commenting on the results obtained a preliminary remark should be made with respect to the magnitude of the coefficients of determination. It appears that the coefficients of determination (R^2) in Table 4 are generally higher than the R^2 obtained for the equations of the same form in Table 1. This is because of differences in the composition and reduction in size of the sample, and/or the change in the level of aggregation.

The statistical results of Table 4 can be summarized as follows. For the Primary sector only the size variable, log P, adds something to explaining the observed differences between countries in the ratio of Primary employment to population. The inclusion of this variable does not affect the magnitude of the regression coefficient of log Y/P.

For the Secondary sector, the coefficient of determination is increased considerably by introducing exports of manufactured and of primary products, successively as explanatory variables. The inclusion of these variables decreases substantially the regression coefficient of the per capita income variable, however. This is due, *inter alia*, to the fact that log Y/P and log E_m/P are intercorrelated, the correlation coefficient between these two variables being 0.727. In the Tertiary sector, the export variables are again the only variables that are associated with an increase in R^2, but there the increase is very moderate and the standard errors of the regression coefficients of log E_m/P and log E_p/P are very high.

To conclude, then, only for the Secondary sector does the inclusion of additional explanatory variables lead to a substantial improvement of the statistical fit (1).

(1) Like CHENERY and TAYLOR, we also performed multiple regressions on subsamples of large countries, small industry-oriented and small primary-oriented countries. Because the number of observations in those samples was small, the restults obtained were very uneven in quality, so that we thought it not worthwhile to publish them. Readers particularly interested in the outcomes of those regressions, can write to the authors, Seminar of Applied Economics, Universiteitsstraat 14, Ghent, Belgium.

APPENDIX A

TABLE A. :

Economically Active Population, by Sector, Gross Domestic Product per Capita, and Population, for 68 Countries

Country	Economicaly-active Population by I.S.I.C. Division per 1,000 of Total Population (L_1)								G.D.P. Per Capita (U.S. $)	Population (1,000)
	Ag. 0	*Min.* 1	*Mfrg.* 2-3	*Constr.* 4	*Utils.* 5	*Comm.* 6	*Transp.* 7	*Serv.* 8		
Africa										
1. Algeria	279	1.2	16.1	9.2	0.60	18.5	6.7	17.0	132	9,444
2. Congo (Leo.)	435	6.1	15.3	12.8	n.a.	6.6	8.2	15.3	91	12,538
3. Gabon	404	16.4	9.2	8.0	0.29	17.8	6.2	15.3	216	458
4. Ghana	235	7.2	35.0	13.3	2.10	55.2	10.2	23.1	204	6,727
5. Ivory Coast	437	0.8	4.2	4.5	1.86	34.2	11.4	11.1	118	3,665
6. Mauritius	104	0.2	40.2	29.1	3.34	27.6	17.3	51.4	270	682
7. Morocco	158	3.4	22.9	4.8	0.70	20.6	6.9	27.7	142	11,626
8. Mozambique	221	0.3	13.7	3.4	n.a.	4.1	2.8	20.3	25	5,700
9. Niger	263	n.a.	1.6	n.a.	n.a.	2.3	0.6	2.5	61	2,823
10. South Africa	107	38.3	42.9	17,6	2.44	28.9	13.5	77.6	493	15,822
11. Sudan	405	n.a.	23.5	3.0	n.a.	9.7	3.0	21.7	69	10,263
12. Tunisia	229	3.6	20.8	7.2	0.73	15.9	6.7	21.6	151	3,943
13. U.A.R. (Egypt)	170	0.8	27.1	6.1	1.40	24.3	9.9	51,9	146	25,952

Country	Economicaly-active Population by I.S.I.C. Division per 1,000 of Total Population (L_1)								G.D.P. Per Capita (U.S. $)	Population (1,000)
	Ag. 0	*Min.* 1	*Mfrg.* 2–3	*Constr.* 4	*Utils.* 5	*Comm.* 6	*Transp.* 7	*Serv.* 8		
Asia										
14. Ceylon	191	1.7	36.6	6.8	0.64	29.7	12.6	58.2	108	8.290
15. India	316	2.1	41.1	4.7	1.45	17.6	6.9	38.3	74	435,512
16. Indonesia	246	0.9	19.4	6.1	0.53	22.9	7.2	32.4	73	95,655
17. Iran	177	1.3	43,5	17.9	0.63	18.9	11.1	34.9	160	18,765
18. Iraq	135	0.6	26.9	12.7	1.78	14.5	14.1	40.2	136	6,343
19. Japan	137	3.3	121.2	30.2	2.43	97.7	28.0	75.8	528	95,899
20. Jordan	81	5.4	19.2	23.5	0.00	18.4	7.0	31.4	204	1.706
21. Nepal	470	0.0	9.8	1.0	0.09	7.0	2.4	11.6	50	8,257
22. Pakistan	240	0.2	26.0	3.7	0.38	15.6	5.5	25.9	79	94,547
23. Philippines	188	0.9	30.6	6.5	0.47	18.5	7.3	33.2	113	27,407
24. Singapore	28	1.1	46.2	17.0	3.89	84.0	34,8	110.1	322	1.446
25. South Korea	186	2.0	24.6	7.0	0.51	31.6	6.0	43.0	124	27,277
26. Taiwan	162	4.9	35,3	6.7	1.67	21.7	11.6	45.8	92	9.240
27. Thailand	430	1.1	17.9	2.6	0.58	30.0	6.3	24.8	84	26,388
Europe										
28. Austria	109	7.1	135.8	47.0	4.92	52.1	27.8	86.9	936	7.087
29. Belgium	25	11.0	133.1	29.7	3.32	57.9	26.4	93.3	1.324	9.290
30. Denmark	80	0.8	130.3	32.8	2.81	68.4	32.9	101.1	1.177	4,581
31. Finland	163	1.5	98.9	39.8	4.26	53.4	29.1	68.1	576	4,430
32. France	83	6.8	113.2	34.3	3.91	55.2	22.6	84,1	1,493	46,998
33. Germany, F.R.	55	12.8	182,1	38.6	3.96	67.8	27.6	97.3	1.879	5,430

34. Greece	233	2.6	58.2	19.9	2.36	31.7	18.3	52.3	412	8.402
35. Iceland	164	n.a.	94.7	41.2	5.41	40.6	35.0	63.1	940	143
36. Ireland	138	3.7	66.5	26.1	3.85	58.0	20.5	74.0	793	2,818
37. Italy	99	2.9	112.5	43.6	3.25	55.3	20.6	56.8	980	50.457
38. Netherlands	39	5.3	108.6	35.2	4.09	58.9	25.2	35.4	1.038	11,480
39. Norway	77	2.5	100.0	37.2	3.58	52.2	46.8	72.4	1.326	3,581
40. Portugal	164	3.0	78.9	26.0	1.64	30.9	14.0	56.7	271	8,826
41. Spain	159	6.7	84.0	27.1	2.67	30.1	17.7	53.4	355	30,303
42. Sweden	60	3.2	148.3	39.4	4.72	58.6	32.3	86.0	1.507	7,480
43. Switserland	52	1.2	186.4	44.7	4.06	64.6	25.2	89.4	1.532	5,362
44. United Kingdom	23	17.0	167,1	28.3	7.13	62.5	34.3	106,1	1.019	50,562
North America										
45. Canada	33	6.2	84,6	19.9	3.86	72.9	27.1	97.5	1.970	18,928
46. Costa Rica	145	0.8	33.9	17.4	3.15	28.9	11.0	50.9	260	1,338
47. Cuba	139	1.6	55.7	11.1	1.44	39.5	17.7	67.4	245	5.876
48. El Salvador	194	0.3	41.2	13.1	0.68	20.6	6.9	41.9	178	2.511
49. Guatemala	235	0.5	39.8	9.4	0.44	18.7	5.5	24.1	194	2,805
50. Haiti	430	0.0	25.3	3.0	0.31	18.2	1.9	23.8	85	3,380
51. Honduras	200	0.9	23.2	6.1	0.41	14.3	4.2	36.7	193	1,893
52. Jamaica	147	2.8	55.5	30.9	1.96	37.3	12.0	82.3	390	1,614
53. Mexico	176	4.0	44.5	11.7	1.18	30.7	10.2	43.7	335	34,988
54. Nicaragua	184	2.6	36.1	10.3	0.82	22.4	7.8	43.8	198	1.541
55. Panama	147	0.4	24.0	13.5	1.58	28.9	9.4	63.7	354	1,062
56. Puerto Rico	69	0.6	43.2	22.1	5.10	39.0	12.3	59.4	550	2,362
57. United States	27	3.1	102.8	25.9	5.57	92.5	19.8	112.4	2.790	189,375
South America										
58. Argentina	73	2.2	95.8	21.2	4.37	45.2	23.9	75.9	573	20,006
59. Bolivia	223	14.3	36.4	8.6	13.49	18.9	7.1	23.1	84	3,012
60. Brazil	165	8.1	28.3	11.1	n.a.	n.a.	15.3	38.5	130	70,967
61. Chile	86	11.8	55.4	17.5	2.44	31.2	15.2	70,4	398	7.736
62. Colombia	175	5.3	39.8	11.5	0.90	17.6	11.2	51.6	204	11,589
63. Ecuador	186	0.8	48.7	11.1	1.07	22.5	10.0	44.2	165	4,317

Country	Economicaly-active Population by I.S.I.C. Division per 1,000 of Total Population (L_1)								G.D.P. Per Capita (U.S. $)	Population (1,000)
	Ag. 0	*Min.* 1	*Mfrg.* 2-3	*Constr.* 4	*Utils.* 5	*Comm.* 6	*Transp.* 7	*Serv.* 8		
64. Guyana	105	10.7	46.4	22.8	1.63	32.3	13.6	51.3	275	567
65. Paraguay	177	0.2	51.5	10.1	0.64	22.0	8.3	56.8	117	1,817
66. Peru	150	6.4	39.7	10.1	0.83	27.2	9.1	46.0	220	10,365
67. Surinam	58	16.1	20.7	6.5	2.33	25.7	5.5	69.1	314	345
68. Venezuela	102	6.1	38.8	16.8	3.34	40.0	14.0	75.1	716	7,612

(1) I.S.I.C. is the International Standard Industrial Classification of All Economics Activities, published by the United Nations. The divisions are :

0 Agriculture, Forestry, Hunting and Fishing.
1 Mining and Quarrying.
2-3 Manufacturing.
4 Construction.
5 Electricity, Gas, Water and Sanitary Services (Public Utilities).
6 Commerce.
7 Transport, Storage and Communication.
8 Services.
9 Activities not adequately described (excluded from the table).

The employment data used conform as closely as possible to this classification.

(2) The dates attached to the observations range from 1950 to 1965. Most observations fall within the range 1960-1963, however. Care was taken to use data on the independent variables centred on the dates attached to the employment data for each country.

Sources : *Employment data : Year Book of Labour Statistics, 1965*, International Labour Office, Geneva, 1966. Table 2A
Population data : Demographic Yearbook, 1963, United Nations, New York, 1964. Table 4.
Income data : Yearbook of National Accounts Statistics, 1964, United Nations, New York, 1965. Tables 6A and 6B. (Table 6B was used wherever possible in preference to Table 6A).

APPENDIX B

List of Countries included in the Multiple Regression Analysis

1. Large countries : Argentina, Brazil, Canada, France, Germany, Italy, India, Japan, Korea, Mexico, Pakistan, Philippines, Spain, Thailand, United Kingdom and United States.
2. Small primary-oriented countries : Congo, Ceylon, Chile, Columbia, Costa Rica, Denmark, Ecuador, El Salvador, Guatemala, Honduras, Iraq and Venezuela.
3. Small industry-oriented countries : Austria, Belgium, Finland, Greece, Jamaica, Haiti, Netherlands, Norway, Paraguay, Peru, Portugal and Tunisia.