

## Summary of Selected Articles

E.J. Berg, "Backward-Sloping Labor Supply Function in Dual Economies—The Africa Case" *The Quarterly Journal of Economics*, August 1961.

There is a wide-spread conviction that the labour supply function in underdeveloped countries tends to be backward-sloping. Surprisingly, the concept has not been subjected to much systematic analysis, and considerable confusion over the fundamentals prevails. This paper attempts to avoid such confusion by explicitly recognizing the fact of change over time and by sorting out several of the various labour supply functions pertinent to the African context. The analysis centres on the factors determining the shape of three labour supply curves:

- (1) of individuals,
- (2) of the exchange economy as a whole, and,
- (3) of the standard political units.

The characteristics of 'dual' structural and sociological nature of the African economies affect the labour supply curves. There is a limited exchange sector and the unskilled labour employed in it consists of the temporary emigrants from the subsistence sector. Moreover, the massive circulation of Africans between their villages and paid employment outside is the characteristic feature of labour market in most of Africa. The majority of wage-earners in most African countries is not permanently fixed in terms of wage employment. Nevertheless the major factors determining an individual's offer curve for paid employment in African villages are the same that prevail in any exchange economy, namely (1) intensity of individual's preference for money income as against leisure in the village, (2) level of his income from village production, (3) effort price of income that can be earned in the village, (4) effort price of income that can be earned outside the village.

Analysis shows that the quantity of wage-labour offered by the individual African tends to be inversely related to changes in village income and changes in wage rates in the exchange sector. This relationship was more pronounced in the early years when migrants tended to be target income workers. Their elasticity of demand for income, once their target-income was achieved, approached zero for everything except leisure.

In contemporary Africa, the target-income concept is losing its applicability as wants have increased in size and flexibility. This concept does not apply at all to "committed" workers who no longer shuttle between village and outside employment. Moreover, the number of individuals in wage employment varies with the level of village income and changes in the level of village income. This was markedly true in the early period of contact and remains a strong tendency even today.

Many factors determine the size of the aggregate labour supply available for employment in the exchange sector. The level of village income which fluctuates with the size of village harvests, and the rate of wages in the exchange sector are two most important variables in explaining short-run

changes in the aggregate labour supply available outside the villages in Africa. Analysis shows that the shape of the aggregate labour supply function cannot be predicted *a priori* since it depends on the net outcome of two contrary changes that follow a wage change: changes in the number of villagers in wage employment and changes in the average time each spends at work. In earlier years the aggregate supply of labour to the exchange economy as a whole probably tended to be backward-sloping in the relevant ranges. A rise in wages would induce few new men into employment while it encouraged many of those in paid employment to cut short their stay.

In contemporary Africa, this is no longer true. A wage rise stimulates relatively many more men to emigrate into paid jobs and leads for fewer to reduce their time in paid employment. Finally, labour markets for unskilled labour in Africa, in most instances, cut across political boundaries. When this international character of African labour markets is taken into account it is most unlikely that for any given country (*a fortiori* for any given industry or firm) the aggregate supply of labour was ever negatively elastic with respect to wage rates.

(M.H.)

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R.S. Eckaus, "The North-South Differential in Italian Economic Development", *The Journal of Economic History*, September 1961.

Although the Italian economy has developed greatly over the past century, Southern Italy has lagged far behind the North. The causes of this disparity in the economic growth of the two regions are uncertain, though the experience has been frequently discussed. The positions of the earlier analysts are basically two: (1) that an economic differential between Northern and Southern Italy was absent at the time of unification (1861) but that subsequent government policy, chiefly fiscal and commercial policy, discriminated against growth in the South; or (2) that the regional disparity long antedates unification and that the growing gap results not so much from different growth rates as from the South's handicapped start a century ago.

Unfortunately, the evidence on the relative economic positions of the two regions at the time of unification is partial and disparate. But it does strongly suggest the clear superiority of the North over the South by 15-25 per cent in per capita income at that time. The data on social overhead capital and economic structure indicate that the transformation from traditional ways of life was well started in the North. Furthermore, the North had the advantage of a substantial source of foreign exchange (silk).

By the early twentieth century, much of the industry of the North compared favourably with the world's most efficient; and the technology of its agriculture has vastly improved. Only a few backwaters of inefficiency remained. In the South, however, despite some new industrial activity and agricultural advances, growth was slow. Political unification had not reduced the economic gap between North and South, although it may have reduced the rate at which it widened.

The Italian economy was growing, over 1861-1911, at something like 4 per cent per year, but available statistics suggest that this rate was not uniform over all Italy. For example, agricultural production grew, during those years, by 295 per cent in the North and by 228 per cent in the South.

This failure of the South to keep pace with the North was not the result of inadequate increases in social overhead capital, for the rate of railroad construction in the South was rapid over this period; by 1909, rail mileage in the South was within a few per cent of that in the North (by total length and relative to land area). The high Italian wheat tariff seems to have favoured the South, although it is always difficult to isolate tariff effects in historical data. It is not at all certain that the regional effects of government fiscal and commercial policy were favourable to the North.

What is left to account for the much slower development of the Southern regions? A plausible explanation is that the South was already at an economic disadvantage in 1861 and that, not surprisingly, this disparity increased. Southern Italy had relatively cheap labour, adequate rail transport and was at no raw material disadvantage relative to Northern Italy. However, its population pressed too hard on its too slowly expanding agricultural base to form a market for industrial products sufficiently broad and growing to induce industrialization.

(R.C.P.)

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**R. W. Lindholm, "The Farm: The Misused Income Expansion Base of Emerging Nations", *Journal of Farm Economics*, May 1961.**

This paper points out and analyzes some of the historical, behavioural, political and economic considerations which explain the low-per-capita-income countries' failure to emphasize the importance of industrial agriculture in their development plans.

The following factors mainly account for the neglect of agriculture in the newly evolving societies:

- (1) The new agricultural experts of the developing countries, inspired by the American professors of agriculture, believe in family farms.
- (2) Pre-World-War-II France and Germany, where agriculture remained primitive, were accepted as a model of growth.
- (3) The large-scale unemployment as a concomitant of mechanization of agriculture posed too big or too nebulous a question.

The agricultural policy of the developing economics in 1961 has been shaped by the above considerations, yet the evidence shows that Japan's resurgence in the post-war period and Puerto Rico's speedier growth are both agriculture-rooted. The main pitfall of much of the economic planning in the emerging nations is related to the failure to emphasize agriculture

as a major industry.

The basic economic relationship of a development programme using agriculture as its core is that if food production can be raised or even maintained with a smaller labour force, more workers can be supported and put to work on projects indirectly linked to farming as well as on schemes entirely unrelated to agriculture. This approach means that the first job of economic planning would be (1) to maintain and increase productivity in agriculture and (2) to develop ways to use surplus labour thereby created.

Planners in the developing countries attach top priority to industrialization mainly to provide employment opportunities outside of agriculture. The major bottleneck of such a policy has been that the agricultural sector could not provide the food surpluses required to meet the need of the growing urban population. Besides, there were other difficulties too which are big enough to justify an alternative approach.

The following discussion is based on the fact that agriculture is not only the principal industry but it is also an industry where labour productivity using modern techniques can be greatly expanded. Therefore, agriculture is the prime area to be attacked in raising productivity.

Japan's experience must be borne in mind while formulating development programmes for the newly evolving nations. Japan definitely used agriculture as the keystone of its programme. Accordingly, economic planning should treat agriculture as the basic industry and use its rising productivity to support people engaged in the variety of activities carried on in the growing economies. Such a plan might adopt the following course of action.

1. Modern agricultural methods should be taught on the lines of a crash programme to capable and willing salaried students.

2. Sufficient land should be procured by the government for sale to the graduates of the above programme. The size of each farm should be such as to ensure sound commercial agriculture and the land purchased may not exceed this requirement. The sale contract would provide for annual payments. Machinery would be financed through rental arrangements.

3. The taxes levied on land in the above farms would be assessed on the basis of their capitalised value. The assessed value of all other agricultural land would be gradually raised to this level.

Higher land taxes may improve the efficiency of the farmers. Besides, larger tax yields would finance programmes aimed at improving the productivity of the peasants released from agriculture and this procedure would also furnish a political base.

4. Persons no longer required in agriculture would be employed by the government to work on various useful projects. Their salaries would be met from higher land tax proceeds. These new employees would also be given evening technical training courses.

5. Production of farm machinery would receive priority in the

industrial sector. In the distribution and marketing sectors, priority would be given to those aspects most directly related to agriculture.

Particular attention would have to be given to the production of raising crops which command a strong world demand. Such a plan moves gradually from the country-side to the towns. The basic aim of the programme is to make better use of manpower and to treat agricultural land as an industrial resource.

The alternative, of course, is industrialization of fabrication. The industrialization of fabrication before the industrial agriculture base is developed looks like building the roof of a building before the foundation and side-walls are completed. This alternative approach would involve the use of much manpower and materials for giving support to the roof and which could well be utilized to construct the side-walls and the foundation, if the erection of the roof were postponed to a later date.

(R.A.K.)

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A. Yoder, "Communist China's Economic Growth in Perspective", *The American Journal of Economics and Sociology*, July 1961.

The purpose of this paper is to throw light on Communist China's economic growth by comparing it with the growth of the Republic of China, Japan and Hong-Kong—countries with similar geographic, racial and cultural heritages. Also it outlines an approach for analyzing the relative effectiveness of the Chinese Communist system in promoting economic growth. Many analysts believe that, theoretically, if a regime can hold down consumption, it will promote a large volume of investment and growth potential. Thus, while apparently the paper compares the increases of overall output and GNP, implicit throughout the argument is the fact that the free world countries expanded with free institutions and regard for human happiness, while the Communists expanded under repression and efforts for territorial expansion. The comparisons operate, however, under the limitations of comparing GNP's of diverse economic systems by using exchange rates.

Special mention is made of the doubtful nature of the Communist official statistics, which tend to neglect the large statistical weight of agriculture, thus exerting a considerable drag on overall output statistics. A critical examination of the official statistics about growth in the agricultural and industrial sectors in Communist China, shows that growth rates are generally highly exaggerated. It is concluded on the basis of the author's own estimates that the maximum average increase in overall output in Communist China during the period 1953-59 has been about 10 per cent per annum.

Japan is considered to have experienced a similar increase in overall output during this period. A comparison is also made with two earlier periods (1872-1884 and 1931-38). In this comparison it is clearly brought out that Japanese expansion took place under a free enterprise system, without substantial outside help, while Communist China had access to Russian

technicians and training facilities, and the ability to suppress private consumption.

The Republic of China (Taiwan) has been able to expand its output by about 6-9 per cent annually during this period. It has succeeded in considerably reducing its dependence on primary commodities and in making its economy more industrialized. Taiwan has, however, had access to a considerable extent to grants, aid, and loans from the United States.

The Hong Kong economy too changed during this period from being basically a commercial economy to one in which industry is important. It has had an annual increase of about 7.6 per cent in GNP at constant prices.

A comparison of relative levels of GNP in these countries bears out the conclusion that Communist China's "great leap forward" is really not as spectacular as the Communist Party claims it to be. Growth in Japan, Taiwan and Hong Kong is comparable with that of Communist China. Besides, growth in Communist China has been attained with strict regimentation and control on private consumption. The extra cost involved in this regimentation is indicative of the ineffectiveness of the Communist regime's economic system.

(N.S.)

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**J.V. Krutilla, "Welfare Aspects of Benefit-Cost Analysis", *Journal of Political Economy*, June 1961.**

This paper, on the basis of a survey of the existing literature on welfare economics, seeks to set some practicable decision rules for public expenditures. Here, considerable emphasis has been given to the benefit-cost analysis in judging the relative preferredness of alternatives. This is done by comparing the differences in the relevant social costs and benefits associated with different projects. The purpose of this social cost-gains calculus is to seek to maximize "general welfare". Underlying this analysis is the value judgement that if governmental intervention is justified, public decision rules ought to improve the allocation of resources.

While intervention is required to correct divergences between private and social product and cost, both the initial conditions and the associated side effects are of relevance. It has been contended that welfare can be improved by such intervention, if gross benefits achieved exceed associated opportunity costs, and if (a) the initial income distribution is retained, (b) it is in some sense the "best" distribution and (c) the marginal social rates of transformation between commodities are equal to their rates of substitution, except for the area justifying the intervention in question. Under these assumptions welfare is maximized when social marginal rates of transformation between each pair of commodities are equal to their rates of substitution.

In the event that condition (a) does not hold, it is necessary to make

interpersonal comparisons. This implies that the resulting distribution should be such that those who gain are able to "and do" compensate those who lose, and still remain better off. Interpersonal comparison is necessary also when there is uncertainty about the "goodness" of original distribution of income. If, however, welfare implications of public intervention are ignored, then "aggregate real income" can be said to have increased if the beneficiaries of resource re-allocation can overcompensate the losers, without there being any actual redistribution of income to that effect. It is contended that while the absolute size of the national income may not be independent of its distribution, a relatively small change in its size can be considered independently of its redistributive consequences. For all practical purposes, the crucial task should be to judge whether aggregate real income would increase consequent to public expenditure.

Of course, this does not mean that benefit-cost analysis is free of distributional value judgements. In as far as "scoping" of programmes relies on price data, which in turn is dependent on the prevailing distribution, a judgement is implied regarding the normative status of the existing distribution. On this question as to whether the prevailing distribution reflects a socially-sanctioned desirable distribution (in a democratic society), there are diverse views. Here the author seems to favour the position of Little which considers the existing distribution as non-optimal, and focuses on conditions sufficient for an improvement in welfare rather than on conditions necessary for maximizing welfare.

The question to be answered in this context of non-optimal initial conditions of production and exchange is this: how "Pareto Optimum" can be approximated when prices do not reflect true opportunity costs? It is argued that in such a situation though marginal equalities are likely to provide an ambiguous criterion, it is useful in indicating the relative efficiency of public expenditures in different lines. In any case, so the argument runs, prices are generally adequate for the range of policy decisions with which a benefit-cost analysis is concerned.

This approach might fail to lead to any intellectually satisfying result, but is nonetheless useful in providing decision rules which are likely to produce consequences superior to those that would result from purely random behaviour.

(A.I.)

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**A. Williams, "Fiscal Policy and Interregional Resource Allocation", *Public Finance*, No. 2/1961.**

In this paper the resource-allocation aspects of fiscal policy are analyzed with the help of a simplified two-region, two-good and two-factor model. The general assumptions used are perfect competition, fixed quantity of resources and their full employment, constant returns to scale and no change in technology and population. A special assumption is made with respect to the interregional mobility of labour: labour will move between regions not in response to differences in its own specific reward, but in response to differences in general living standards between regions.

One region (rural) is supposed to specialize in the production of food (by a labour-intensive process) and the other region (urban) in the production of clothing (by a capital-intensive process). Initially the factors employed in each area are owned entirely by the residents of that area. If real per capita income in the two areas differ (by more than some specified margin) then labour moves from the area where such income is relatively low to that where it is relatively high. In the short run capital cannot move at all, but in the long run it will move where it will earn the greatest reward. The incomes of households are assumed evenly divided within each region and all households have identical tastes. The income elasticity of demand for clothing is assumed to rise as real income rises, and for food to fall. There is no saving.

The economy is initially supposed to be in a state of general equilibrium where the Pareto optimum conditions are fulfilled for production and exchange, and real per capita income is the same in both regions. It is assumed, for the time being, that the populations of the two regions are equal in size. Then with a conventional transformation-box diagram analysis this situation is depicted.

In the no-government case the question of what happens to the short-run and long-run adjustment processes when this equilibrium situation is disturbed by an identical change in all tastes is graphically examined. It is found that both the short-run and long-run equilibrium situations will be below the general production possibility frontier.

Fiscal policy is then introduced into the model. First is shown a case where a direct tax on one region and an equivalent subsidy to the other region will prevent labour shift from taking place and will leave the equilibrium situation undisturbed in the short-run. But since the marginal rate of substitution in the market will deviate from the marginal rate of transformation, in the long-run capital movement will take place leading to an equilibrium situation which also lies below the general production possibility frontier. This type of fiscal policy could, nevertheless, be used to bring about a shift onto the frontier if this were considered desirable. Such a policy will involve creating real income differentials so as to shift labour in the desired direction.

Then it is demonstrated that the same results could be obtained by means of indirect taxes and subsidies.

Now if the government is treated as a purchaser of goods and services, the analysis shows that the desired policy objectives (providing the amount required by the Government, leaving the commodity markets in equilibrium *etc.*) may be attained by a variety of alternative ways such as (i) a relatively low direct tax on one region coupled with a relatively high one on the other, (ii) a general indirect tax supplemented by a direct tax on one region, and (iii) an indirect tax on one commodity and a uniform poll tax in both areas.

The model thus worked out is then interpreted as one which can be manipulated by relaxing some of the restrictive assumptions without thereby critically affecting the results obtained.

The conclusions of the paper stand as follows. In principle, no particular



type of fiscal policy can be either commended or condemned. Direct taxes may be just as good as indirect taxes. Similarly, "discriminating" taxes may not be any more "distorting" than ostensibly "uniform" ones. Nor, again, could one say that in principle a situation with government fiscal interference is necessarily better or worse than one without any. Lastly, whether or not a policy of real income equalization between regions is good or bad for inter-regional resource allocation will in effect depend on the actual measures taken. It is the way in which a policy is pursued that counts, not the pursuit of the policy itself.

(A.R.)

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**L.R. Klein, "A Model of Japanese Economic Growth, 1878-1937",** *Econometrica*, July 1961.

This paper analyzes the long-run growth of Japan by using the econometric model-building technique. The basic sample for the model is the body of statistics on Japan recently compiled by Prof. Ohkawa, supplemented by standard data on trade and population, covering 12 quinquennia from 1878 to 1937. Historical statistics of saving and investment are not available, so the model is more restricted in scope than the customary models of growth. Yet it attempts to reflect some of the essential characteristics of the Japanese economy. The model has only two sectors: 1) primary (agriculture, forestry and fishing); 2) non-primary (the rest of the economy). The central relationships in the model are the long-term trends in output per gainfully employed person, with productivity assumed to grow at a compound interest rate. These are expressed in two equations for the two sectors, and are then transformed into two semi-logarithmic trend regressions. An equation for occupied to total population, based on a trend with compound interest growth, is introduced. The third equation is a non-statistical equation relating present population to past population through birth, and death rates. These two rates are endogenous variables and are explained by two semi-logarithmic equations relating the rates to per capita real output. The birth rate first rises and then falls asymptotically as per capita output rises. The pattern of death rates is similar but less pronounced. The seventh equation posits a global form of Engel's Law that as per capita income rises the percentage represented by food (primary production plus food imports) declines. The eighth equation relates output of the non-primary sector to the vitally needed imports of raw materials and capital equipment. Two non-statistical equations complete the ten-equation model. One states that net output of the two sectors make up total net output in real terms. The other says that import value equals export value. The only price variables in this real system are the prices of imports and exports. Export quantity and terms of trade are regarded as exogenous variables.

Thus the ten-equation model has ten endogenous variables: (1) primary output; (2) non-primary output; (3) persons engaged in primary output; (4) persons engaged in non-primary output; (5) total output; (6) total population; (7) total import; (8) food import; (9) birth rate; (10) death rate. Where the variables are pure time trends or lagged variables the equations with unknown coefficients are estimated as least-square regressions from

12 observations (quinquennia). The two equations, requiring parameter estimation, were estimated by the method of sub-group averages. The estimated system implies a quinquennial growth rate of about 12.6 per cent in productivity in the primary sector and 15 per cent in the non-primary sector. The ratio of occupied to total population is nearly constant at an average of about 50 per cent. With the growth of per capita income the birth rate first rises and later falls asymptotically to 9 per cent per quinquennium, while the death rate rises and falls more gently. The Engel coefficient is smaller than 0.6. Imports in some years exceeded exports, but the trade balance equation is not a bad fit to the data.

The model provides an interpretation of Japanese economic history, showing how exports affect the economy, the need for food and other imports, the growth of population and of productivity. It can also be used in the study of the prospective rate of economic growth which is still an unsettled question.

The long-run average annual growth rate is 4.3 per cent and that for the post-war period is about 9 per cent. If the future has the structure of the past this model gives a basis for numerical extrapolation of the future trend growth subject to uncertainty about exports. Assuming fixed terms of trade the model is extrapolated for annual growth rates (of 4, 5, 6 and 7 per cent) of real exports (hence import capacity) to project different rates of output growth in the 1960's. An annual export growth of 6 per cent is close to historical fact and is considered a reasonable expectation for the decade. This permits an annual output growth of 5.3 per cent, raising income by 70 per cent between 1960 and 1970.

Some non-econometric observations are made on possible structural changes that took place in post-war Japan, like (a) land reform, (b) breaking up of monopolies, (c) growth of trade unions, (d) loss of dependent territories, (e) reduction in military establishment, and (f) physical destruction of World War II. It is suggested that land reforms, and rapid technological progress made for a high rate of growth in the post-war period. Low military expenditures also contributed much to growth. The high growth rate of the 1950's reflects reconstruction growth. This factor will be absent in the 1960's.

Considering these possible structural changes and their future impact, it is concluded that an annual growth rate of output at 5.3 per cent is reasonable and provides a better framework for future planning than does the official programme with the target of doubling real national income between 1960 and 1970.

(S.R.B.)

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**M. Laloire, "Small-Scale Industry in the Modern Economy", *International Labour Review*, October 1961.**

Small scale industry is an undertaking in which the owner is founder, provider of capital, and technical manager. Small-scale and large-scale industries co-exist not only in the less developed but also in the highly developed countries. Small- and medium-sized concerns generally surpass

the industrial giants in the number of undertakings and in the number of employees.

Technological progress has both an adverse as well as an encouraging effect on small-scale industries. While handmade tools are increasingly being replaced by machine-made tools, technological progress has opened up new avenues for small-scale industries. Small-scale industries tend to predominate in the following areas where: a) they satisfy local and highly specific demands; b) mass production is generally impossible as in artistic industries and crafts; and c) little capital is used as in maintenance and repair work.

Small-scale industry provides employment to a large section of the population both in developed as well as in underdeveloped countries. Since the cost of establishing such an industry is relatively small, it offers an opportunity for workers who become redundant as a result of technological progress. It is an important means for achieving regional development which has become a national policy for many countries. In places where large-scale industries cannot be established due to lack of communications, or other obstacles, small-scale industry provides a ready answer. Small-scale industry also helps avoid too much congestion in industrial cities, thus providing a check to rural depopulation. The role of small-scale industry is especially important in a developing economy because besides providing casual and full-time employment to a large section of the population, it ensures a better distribution of purchasing power. It also trains people in the rural areas in the use of machinery. This training can ultimately help the big industries.

Three main tendencies are visible in small-scale industry in the developed countries, namely: a) the size of individual undertakings is increasing; b) closer relations are being developed with large-scale industry; and c) commercial activities of small-scale industries are expanding.

Small-scale industry is facing some difficulties some of which may place its very existence in jeopardy. Its major difficulties are: a) an inefficiency of machinery and equipment making it difficult to produce high quality goods in adequate volume; b) lack of funds to buy suitable equipment; c) lack of skills to manage the machinery and the undertakings properly; d) difficulties in obtaining supplies of raw materials; and, e) marketing difficulties.

Measures are, therefore, necessary to safeguard small-scale industries and to enable them to carry on their economic functions properly. Heads of such undertakings need to be taught not so much the techniques of their trades but the administrative, accounting and financial management of their undertakings, the basic principles of marketing and marketing research. Small-scale industries need to be provided suitable credit facilities. By pooling their efforts, their resources and their experience, small-scale industries can strengthen their position considerably. Collaboration of this type may assume the form of occupational organizations or co-operatives. Public authorities may also create special departments to promote these industries.

Small-scale industries are not merely survivals of the past, but have economic functions to perform. They have bright future prospects provided

that conditions are such that they can discharge their economic functions efficiently.

(A.N.M.A.R.)

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**P.G.K. Panikar, "Rural Savings in India", *Economic Development and Cultural Change*, October 1961.**

While it is commonly presumed that the underdeveloped areas have little or no savings, scant evidence is offered in support of this presumption. The analysis of family budget studies in three widely dispersed regions of India, and two recent sample surveys covering the entire country, suggest that the contrary might be the case. Neither agriculture nor the rural sector in India is a deficit sector as is generally believed. Although net savings are not substantial in absolute terms they still form a respectable proportion of incomes in rural families.

The study of family budgets of peasant proprietors of the Punjab for eleven years, from 1936-37 to 1949-50 (excluding the years 1942-45 for which no information was available), showed an average propensity to save of about 0.12. The annual averages ranged from 0.06 to 0.26 except during 1939-40 when saving exceeded income: the first year of World War II was, however, not a normal year. In view of the small size of the sample no firm conclusion could be drawn from this analysis.

The ratio of gross savings to income of East Indian jute farms for the period 1949-50 to 1954-55, as a whole, was 13 per cent, according to the data collected from 200 farms in Assam, West Bengal and Orissa. Another rural survey conducted in 1949-51 covering family budgets of 3,563 rural households in Hyderabad State indicated gross savings per rural family of about 8 per cent, out of an income of Rs. 1,147. The average propensity to consume was less than unity in fourteen of the sixteen districts, ranging from 0.66. to 1.0. Rural nonfarm families in Saurashtra, according to another inquiry in 1950-51, saved very little. The lowest income groups had heavy deficits while higher income families had a very high propensity to save. Probably the majority of nonfarm population in the villages fell in the low income brackets. The data, however, did not justify any general conclusion.

Average gross investment for all rural families, as indicated by the National Sample Survey of 1950-51, was nearly 12 per cent of gross income per family which, from all sources (in cash and in kind) amounted to Rs. 1,309. If adjustment is made for non-monetary savings or direct investment, which was estimated by the author to be about 40 per cent of the total, gross investment would constitute 20 per cent of gross income. Regional data showed that the gross investment-income ratio (excluding direct investment) in all the regions except West Bengal was above 7 per cent, ranging from 7.3 per cent in Bihar to 21.9 per cent in Madras. It should be remembered that during the year under survey there were natural calamities like draughts causing crop failures in different parts of the country. Ratio of gross savings to investment, excluding saving in kind, of cultivating families was estimated at 16 per cent. After making some broad adjustment for repairs and replace-

ment, the ratio of net savings to income amounted to 13 per cent. Savings of non-cultivating families were found to be insignificant, forming less than 4 per cent of income.

The All India Rural Credit Survey data also indicated that rural families saved about 13 per cent of gross income; this figure did not take into account the changes in cash holdings, jewellery, or saving in kind. Here again, the cultivating families accounted for the major portion of rural saving and the non-cultivating households had barely any net savings.

An examination of saving utilization was difficult in view of the wide gaps in the existing data. The available evidence, however, suggested that the prevailing habits in the disposition of rural savings, such as hoarding cash and precious metals or constructing buildings, diverted savings into unproductive channels. About 35 per cent of average gross savings in 1951, according to the results of Rural Credit Survey, were spent on the construction and repairs of residential houses or other buildings, while the financial investment per rural family amounted to Rs. 3.5 only. In Hyderabad 39.6 per cent of rural family savings were utilized for productive purposes; 35.5 per cent were for unproductive purposes and 14.9 per cent for the payment of interest and repayment of old debts.

(S.U.K.)

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A.N. Hatter and C. Beringer, "Cardinal Utility Functions and Marginal Behavior", *Journal of Farm Economics*, February 1960.

The purpose of this article is to show that certain characteristics of cardinal utility functions estimated for individuals can be used to explain why some persons prefer risky farm enterprises with possibilities of large incomes, and others prefer non-risky enterprises which yield a steady income even though the long-run average income may be low relatively. The argument is based on the utility theory developed by Von Neuman and Morgenstern, who have shown that it is possible to construct an index for the measurement of utility which is unique up to a linear transformation. This index merely implies that a uniquely measurable quantity can be associated with utility. It does not attempt to measure the 'satisfaction' which persons receive from owning certain goods.

The authors have explained in detail the working and the assumptions behind the Von Neuman-Morgenstern utility index. They have also shown how they estimated utility functions for individual farmers by confronting them with a large number of randomly arranged hypothetical gambling and insurance situations.

The utility functions estimated for individual farmers were correlated with other data and it was discovered that farmers in groups having a high marginal utility per dollar of wealth were also those who specialized in the more risky types of farm enterprise. Those who had a low marginal utility per dollar of gain had a high proportion of land in general farming (considered less risky) than those with higher marginal utility. Further, farmers with high marginal utility per dollar were also more likely to incur greater debts than persons with a low marginal utility.

The marginal disutility was derived in a way analogous to that used to derive the marginal utility of gains, it was seen that the type of farming variable was again positively correlated with the measure. Farmers who showed a relatively large marginal disutility for losses engaged in relatively low-risk enterprises, while farmers who have a relatively smaller disutility for losses engaged in the relatively high-risk enterprises.

(S.Q.)

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**K. Arrow, H.B. Chenery, B. Minhas and R.M. Solow, "Capital-Labor Substitution and Economic Efficiency," *Review of Economics and Statistics*, August 1961.**

There are two widely accepted hypotheses about the extent to which capital and labour are mutually substitutable: One is the Walras-Leonief-Harrod-Domar assumption of fixed input coefficients and the other is the Cobb-Douglas function implying a unit elasticity of substitution between labour and capital.

The present study was initiated with the belief that both the hypotheses are unrealistic simplifications of the production function. The starting point of the present study is the empirical observation that the value added per unit of labour used within a given industry shows a high positive correlation with the wage rate. On the basis of this empirical finding attempts have been made to derive a general production function having the properties of homogeneity, constant elasticity of substitution (CES) between capital and labour and the possibilities of different elasticities for different industries.

Basing on a sample of industries in nineteen countries it is found that the elasticity of substitution between labour and capital is in most cases different from one. It is also observed that  $v/L$  ( $v$ =value added,  $L$ =labour input in man years) and  $w$  ( $w$ =wage rate=marginal product of labour under the assumption of perfect competition which is made) are positively correlated within each of the industries. Under the assumptions of linear homogeneity and competitive labour markets, the standard theory of production shows how any particular production function entails a particular relation between ' $v/L$ ' and ' $w$ '. In this paper it is shown that a particular relation between ' $v/L$ ' and ' $w$ ' determines the corresponding production function upto one arbitrary constant.

The production function that is found in this way is christened the "Constant Elasticity of Substitution (CES) Production Function". It has three parameters: the substitution parameter ( $p$ ) which is a transform of the elasticity of substitution; the distribution parameter ( $\delta$ ) which determines the functional distribution of income; and the efficiency parameter ( $y$ ), a change in which brings about a change in the output for any given set of inputs<sup>1</sup>. Statistical tests reveal that the efficiency parameter varies from country to country but that the other two are constants for each industry.

<sup>1</sup> In symbols, the production function is:  $V = y [\delta k^{-p} + (1-\delta) L^{-p}]^{-1/p}$

The variations in the CES production function among industries have a substantial effect on the structural features of economies at different levels of income. Such effects on factor proportions, commodity prices and comparative advantage are investigated through a comparison of Japan and the United States.

CES production function is applied to the time series data in the U.S. The result reveals that the elasticity of substitution is significantly less than one. This serves as an additional test of the validity of the CES production function.

(A.R.K.)

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**D. Dosser, "Tax Incidence and Growth", *The Economic Journal*, September 1961.**

A tax can change both levels and rates of growth, and growth, in turn, can change the incidence of a tax. So a theory of incidence couched in terms of comparative statics is insufficient and needs to be re-assessed in the light of dynamic ideas if the redistributive function of the modern budget is to operate successfully in a growing economy.

The traditional theory measures the incidence of a tax by comparing levels of income of a group before and after the tax. A tax policy is said to be progressive or regressive according as it falls less or more severely on the lower income brackets. As opposed to this, dynamic considerations demand that in the tax structure, levies are apportioned to changes in income rather than levels and that incidence be measured taking into account the effects on the rates of growth in income of various groups.

When the idea of different rates of growth experienced by different individuals and groups is introduced and the effect of the tax on the overall growth rate is considered, the conventional analysis faces some impasse. First, a tax labelled as progressive at some point will turn out to be regressive at some later point in the growth path when the higher rate of growth of the lower income group makes it eventually the higher income group. But in dynamic analysis the tax is regressive all through since it favours the group already experiencing a higher rate of growth. Second, the incidence coefficient of a tax may not be constant; it varies depending upon the type of growth rates operative in the economy. The standard incidence formulation appears as a special case, true only when growth is of a certain kind. Third, the total incidence of a tax may be composed of a change in the proportion of gross income paid in tax (the "gross-net effect") and a change in the gross shares (the "rate of growth effect"). The latter refers to the fact that an increase in the overall rate of growth induced by the tax may benefit one section more than another in gross terms. It was found that the two effects tended to cancel each other when current theory of incidence was applied in a realistic growth setting.

Thus, the problem of incidence needs to be analyzed with its dynamic aspects in view. In order to realize an objective of redistribution continuously

in a growing economy a tax must have not merely a certain incidence, but a certain incidence path. If the objective remains unchanged, it will be wrong to require a tax to have a constant incidence. The incidence should rather be adjusted to the changes that might have occurred in the growth process so that the incidence may help achieve the objective. This may entail the problem of changing the tax structure every time the incidence coefficient is rendered inappropriate by the growth factors. However, certain taxes have properties which ensure an automatic adjustment of the incidence coefficient in favour of the redistribution objective without requiring any change in their structure. Use of these built-in redistributors will reduce the difficulties of active controls over redistributive tools but not eliminate them. Appropriate changes in the tax structure will still be necessary to correct the incidence in conformity with the objective in view.

(N.C.)

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**J.P. Gittinger, "United States Policy Toward Agrarian Reform in the Underdeveloped Nations", *Land Economics*, August 1961.**

During the past decade increasing emphasis has been placed on agrarian reforms of the underdeveloped nations, as a conscious tool of American foreign policy. Primacy has been accorded to changes in land transfer, limitation of rent, security of tenure, and transference of holdings to tenant farmers as key measures to effective agricultural development.

Although active United States support has been accorded to Food and Agriculture Office efforts, initiative on land tenure problems has remained with the host governments. However, the real measure of United States policy toward agrarian reform is evidenced in American diplomatic activity and in the administration of bilateral foreign aid. Whereas in some cases the United States leadership has been particularly important, there are many others where a more vigorous policy might have helped avert serious situations. Philippines, Taiwan, and Vietnam make interesting case studies in this connection.

*The Philippines:* The case of Philippines is one of an opportunity lost. Following the Bell Mission's report in 1950 which took serious note of the deteriorating agrarian conditions in the Philippines, vigorous American support for assistance was secured on the promise of carrying out land reforms, including major land tenure changes. Just when the Philippines conditions were becoming favourable for these changes sudden caution in official American policy crept in. Later, following President Magsaysay's death and the new regime's large landlord interest, the land reforms programme dwindled away with the result that the serious problems of large land holdings, poor tenant farmers, and low agricultural productivity remained unsolved.

*Taiwan:* On the other hand, the case of Taiwan well illustrates how effective timely American assistance can be in resolving tenure problems, and effecting land reforms.

In Taiwan, Chinese-American Joint Commission on Rural Recon-



struction (JCRR) formed in 1948 was instrumental in the implementation of rent reduction and land-to-the-tiller transfer programmes which resulted in spectacular improvements in the levels of rural living and increased production. Surveys show that of the increased income two-thirds is being re-invested in the farm enterprise. Besides, rural unrest has been eliminated. Thus, by a judicious use of aid and insistence on land tenure improvements, Americans on Taiwan were able to accomplish a substantial success.

*Viet Nam:* The problems of rural insecurity and falling rice production characterised South Viet Nam, when the Economic Cooperation Administration first established its aid mission in 1951. Unfavourable circumstances and half-hearted government interest did not permit any effective introduction of land reforms until 1954, when the government was faced with the colossal task of resettling the refugees from North Viet Nam. This provided the Americans the opportunity to get the land tenure security programme and a land transfer programme implemented which together affect three-fourths of the farmers. American support for these programmes included not only technical assistance but also budgetary support. Although these measures have not completely solved the problems of rural insecurity, they have been among the most important and effective measures carried out by the government in the country side.

United States policy toward agrarian reform in underdeveloped nations has been shown to have realized considerable success. However, there have been opportunities which have been lost due to a timid policy towards land tenures. It is suggested that to be fruitful, agrarian reforms must be incorporated as a major American policy objective. Imaginative use could be made of the following devices: counterpart funds or development loans to finance land purchase; surplus agricultural food to tide over any temporary fall in marketing; and selective budgetary and technical assistance.

(I.A.)

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**B.F. Johnston and J.W. Mellor, "The Role of Agriculture in Economic Development", *American Economic Review*, September 1961.**

In virtually all underdeveloped economies agriculture is the dominant sector. The relative size of agriculture declines as development proceeds because of (1) less than unity and declining income elasticity of demand for food, (2) the possibility of a substantial expansion of agricultural production with a constant or declining farm labour, and (3) reduction of costs in manufacturing industries due to modern technology. This structural transformation of an economy seems to be a necessary condition for cumulative and self-sustaining growth.

The most important ways in which increased agricultural output and productivity contribute to overall economic growth are the following:

1. The demand for agricultural products increases with economic development due to high rates of population growth and higher income elasticity of demand for food. With current rates of

population growth ( $1\frac{1}{2}$  to 3 per cent in most of the underdeveloped countries) and a modest rise in per capita income, the annual rate of increase of demand for food in a developing economy can easily exceed 3 per cent and as a result of the expansion of population in cities and in mining and industrial centres dependent upon purchased food, the growth of demand for market supplies is a good deal more rapid than the overall rate of increase. The failure of food supply to keep pace with demand is likely to result in a substantial rise in food prices leading to political discontent and pressure on wage rates with consequent adverse effects on industrial profits, investment and economic growth.

2. Expansion of agricultural exports is likely to be one of the most promising means of increasing incomes and augmenting foreign exchange earnings in a country stepping up its development efforts.
3. Manpower for manufacturing and other rapidly expanding sectors can be drawn easily from agriculture by increasing farm productivity.
4. Agriculture, as the dominant sector of an underdeveloped economy, can and should make a net contribution to the capital required for overhead investment and expansion of secondary industry.
5. Rising net cash incomes of the farm population may be important as a stimulus to industrial expansion.

The most practical and economical approach to achieving sizeable increases in agricultural productivity and output lies in enhancing the efficiency of the existing agricultural economy through the introduction of modern technology, *i.e.*, by spending on development services such as agricultural research, education and extension. The experience of countries in North America and Western Europe and (more pertinently) of Japan and Taiwan supports the proposition that a substantial rate of increase in agricultural production can be achieved largely through more effective use of resources already committed to agriculture and with only modest requirements for the critical resource of high opportunity cost.

Three phases of agricultural development are distinguished. Phase I, growth of preconditions for agriculture calls for creation of rural attitudes favourable towards change through improvements in land tenure and community development programme. Phase II, expansion of agricultural production based on labour-intensive, capital-saving techniques, relying heavily on technological innovations, requires research to develop improved production possibilities, extension-education programmes, facilities for the supplying of inputs of new and improved forms, particularly improved seed and fertilizers, institutional facilities for servicing agricultural production, such as credit and marketing agencies, and rural government bodies for fostering collective action such as building feed roads. Phase III, expansion of agricultural production based on capital-intensive, labour-saving techniques, represents a fairly late stage of development and is generally

distinguished by the fact that a substantial amount of structural transformations has occurred so that agriculture no longer bulks so large in the economy.

Despite diversity among nations, the general thesis advanced is believed to have wide relevance. Rural welfare as well as overall economic growth demand a transformation of a country's economic structure, involving relative decline of the agricultural sector, and a net flow of capital and other resources from agriculture to the industrial sector of the economy. Agriculture's contribution to the requirements for development capital is especially significant in the earlier stages of the process of growth; it will not be so crucial in countries which have the possibility of securing a sizeable fraction of their capital requirements by export of mineral products or in the form of foreign loans or grants.

Although the importance of agriculture's role in development is stressed it is not to be inferred that agricultural development should precede or take priority over industrial expansion. "Balanced growth" is needed in the sense of simultaneous efforts to promote agricultural and industrial development.

(M.I.L.)

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**ECAFE, "Population Growth and Problems of Employment in the ECAFE Region", *Economic Bulletin for Asia and the Far East*, September 1961.**

This article aims at assessing the impact of the present rate of increase of total population and the distribution in urban and rural areas on employment in the countries of the ECAFE region, especially India.

Excluding Japan, which is not typical of the Asian countries either from an economic or demographic point of view, the rate of growth of total population in most of the countries of this region ranges from about 2 per cent to 3 per cent or more. These rates are considerably higher than those recorded at comparative stages of economic development in any of the now highly developed Western countries. Asian countries are already densely populated and are facing extreme unemployment and under-employment problems. So a further rise of population in the present rate of growth is a matter of grave concern in these countries.

The age structure of a country's population and the intensity of work at different ages are the determinants of the size of labour force. The proportion of population in the working ages, usually defined as 15 to 64 years, is considerably lower in Asia than in the industrialized countries. A fertility decline in these countries will result in a relatively faster increase of working age population than of the total population. In four selected countries—the Federation of Malaya, India, Japan and Thailand—the extent of economic activity among the male population is between 50-60 per cent and that among females is 30-40 per cent with a wider variation among other countries of the region. Female labour force participation in urban areas in most countries of the region is lower than in rural areas.

There has been a rising trend of urban migration in most of the Asian

countries, although employment opportunities in urban areas are limited. Projections of urban and rural population growth in India for the period 1951-1981 show that urban population would increase 25 per cent and 130 per cent by 'high' and 'low' projections, while the corresponding increase of rural population would be only 30 per cent and 22 per cent respectively. The absorption of such a growing manpower resource into productive employment in both urban and rural areas is a great problem for India. The U.S.S.R. tackled this problem by absorbing an extraordinarily high ratio of manpower in the industrial sector during a comparable stage of development (1928-1937). Faced with similar problems, mainland China re-organized her labour force with an aim of freeing them from tradition-bound agriculture and employing them in large-scale construction projects in rural areas. At times, restriction on urban-rural migration was also imposed so that the employment market in urban areas was not over-crowded.

A study of unemployment and employment creation in India's five year plans reveals that there has been a growing backlog of unemployment inspite of a rapid employment increase. For the period 1951-1976, an average increase of about 4 per cent per annum of non-agricultural employment and 1 per cent per annum of agricultural employment has been forecast by the Indian Planning Commission, while the estimated achievements during the last two five year plans (1951 to 1961) were only 2.5 per cent for non-agricultural employment and 0.3 per cent for agricultural employment. Employment opportunities in urban areas have only slightly increased, and the urban areas in India are faced with problems of rural-urban migration in excess of the employment opportunities created. A comparison of the estimated increase of urban and rural manpower with the targets of employment creation set forth by the Indian Planning Commission show a need for employment creation at a sharply accelerated rate in India, particularly in urban areas.

The following suggestions are put forward for creating more efficient utilization of manpower resources in India as well as other ECAFE countries:

- (1) The habits of the people have to be changed from a tradition-bound agricultural economy into a more diversified economy through profound organizational and institutional changes.
- (2) To reduce the burden of unemployment and under-employment a national labour service of young idle men may be organized for conservation work of various kinds.
- (3) Community development programmes may also be launched by mobilizing labour on a voluntary basis.
- (4) Education and training should be oriented in order to make available more labour with intensive and extensive vocational training.
- (5) Attempts should be made to decentralize industrial development so that it may serve as a brake on large-scale urban-rural migration.

(M.R.K.)

**P.N. Mathur and H. Ezekiel, "Marketable Surplus of Food and Price Fluctuations in a Developing Economy", *Kyklos*, Fasc. 3, 1961.**

Price fluctuations in foodgrains are often upsetting to programmes of development in developing economies. Yet, in discussions, specially in those on India's situation, an inadequate treatment of the problem is evident from lack of distinction between the problem of fluctuations in foodgrains prices and the general problem of increasing food supply to meet increasing demand. Contrary to such an approach this paper attempts to identify the problem arising out of the peculiar behaviour of a great mass of semi-subsistence farmers, and examines, specifically in the context of the Indian economy, some possible suggestions to reduce the extent of price fluctuations in foodgrains. The paper also examines the system of food zones introduced in India as a measure to curb fluctuations in food prices.

In underdeveloped economies, foodgrain prices depend primarily on how much of the total produce is marketed by the farmers. The size of the marketed portion of foodgrains depends on the amount just sufficient to meet his monetary requirements. The rest is the residual retained by him for consumption. Under such a situation if prices rise, farmers sell less and when prices fall farmers sell more. This sets up an upward or downward spiral of prices. Even if farmers have a surplus out of the retained output in any year, this surplus is saved by them in stocks rather than in money during high prices; and these stocks are released during falling prices.

This peculiar relationship between prices and marketed surplus depends, however, upon the character of the economy. In a developed economy with higher agricultural income and output per capita, it is the "marketable surplus" which is sold during high prices and thus stability in the market is maintained. This points to the fact that as the level of farmer-income increases, the extent of price fluctuations in foodgrains diminishes.

Now while development continues certain interim measures to counteract the adverse effect of the existing marketing process may be undertaken. Increasing the monetary requirements of the farmers through land rents or taxation varying directly with prices of foodgrains or fixed in terms of quantities of foodgrains so that cash requirements are not rigidly fixed for a farm, may bring about the desired result. Some other alternatives may be: advance payment of rents and taxes during the phase of rising prices to offset payments due in years of falling prices; widening of non-food consumption out of increasing income; encouraging monetization of farmers' savings in kind by providing education and bringing in necessary institutional changes to help the farmers save in money in a period of rising prices and utilize the money savings during a period of falling prices.

The system of food zones in India set up the control fluctuations in food prices is based on the idea of self-sufficiency. The zones are formed in such a way that each zone contains in it a few deficit as well as surplus areas. In view of the likely inter-play of the inverse relationship between price and marketed surplus during the marketing process, the pressure of prices from the deficit areas will eventually cause a reduction in the marketable surplus of the surplus areas and accentuate the problem for each region. It would be better to separate surplus areas from deficit areas and siphon off

the surplus to the deficit areas under such a situation as now prevails in India.

(A.A.)

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**R.C. Porter**, "The Economics of Adoption of Improved Practices", *Journal of the East Pakistan Academy of Village Development*, July 1961.

Within a particular cultural-psychological-technological situation, economic factors are important in determining the extent of adoption of improved cultivation practices. The purpose of this paper is to provide a simple economic theory of adoption, and to suggest some further lessons for those who study and seek to promote adoption of new techniques in East Pakistan agriculture. Since the purpose of the paper is to compare the traditional techniques with the new techniques of cultivation, it is assumed simply that the net yield is zero after a calamity and  $x$  in normal years.  $P$  is the probability that a given harvest will be normal and  $(1-P)$  is the probability of calamity. Two assumptions about the farmer's behaviour are made:

- (1) That he prefers situations of *greater* normal-season net yield to those of *less*, other things being equal.
- (2) That he prefers situations where the calamity-season loss is less (or less likely) to those where it is larger (or more likely), other things being equal.

These two criteria work in different directions in general; the security of the relatively cash-less traditional techniques must be weighed against more risky (through in normal seasons more profitable) improved practices

Several conclusions follow from this single economic theory:

- (1) The higher the return per unit of expenditure, the more likely that the expenditure will be undertaken.
- (2) The lower the initial cost of a new practice, for given return per unit of cost, the more likely the adoption of the practice.
- (3) A new technique is more likely to be adopted if it reduces the likelihood of calamity.
- (4) If the yield improvement of a new practice is uncertain, then it is less likely to be adopted. A practice which usually increases normal-year yields greatly, but occasionally does not, will interest farmers less than one whose return is more certain.
- (5) Labour outlays and cash outlays are, to some extent, comparable in the farmer's mind when he considers new techniques.
- (6) Many of the improved techniques are indivisible (*i.e.*, cannot be adopted partially). But the farmers may use the new technique on

some land and the old technique on the rest so as to compromise between the greater yield of the new technique and the lesser risk of the old. This balance-seeking between gain and risk explains much of the partial adoption of the "Japanese Method" in East Pakistan.

- (7) A new practice is more likely to be adopted in a season or region where the calamity probability is low.
- (8) Every improved practice raises the calamity probability in one way: if the farmer mis-applies the technique, it may destroy his crops. Thus, farmers will prefer new techniques that i) depart as little as possible from traditional methods and ii) involve as small a number of changes as possible. Much partial adoption can be explained in terms of avoidance of the concomitant first-use-failure possibility of new practice. The probability of such a failure increases rapidly the more radical the change, and the farmer knows it. This bodes ill for the recommendations of the Food and Agriculture Commission Report which maintains that only through several simultaneous improvements can substantially increased agricultural productivity be achieved.

This suggests several lessons for the future adoption of new techniques in Pakistan. The first lesson is to have more knowledge about each improved practice, especially as to its economic implications. The problem of encouraging adoption is two-fold; one, knowing the economic attributes of the process, and, two, knowing the farmer's attitudes towards these attributes. The second is basically a matter of learning something about the relative importance of gain and risk (criteria one and two). As economists, we study at length profit, or net return; future studies of attitudes toward adoption must consider more fully the risk factor.

The psychology of risk-aversion among farmers may be developed in order to have a fuller understanding of the problems of adoption of improved techniques. The efficacy of subsidies and crop insurance might deserve consideration as methods of minimizing calamity loss. Similarly flood-and water-control schemes should be recognised as methods of increasing the likelihood of normal seasons.

There is a need to distinguish between willingness to adopt and ability to adopt (new practices). There are people (the well-off rural groups) who can invest but do not while there are others who desire to invest but have no funds to do so. Only when the minds of the potential adopters are more fully understood and the economic attributes of the improved techniques are more clearly seen, will extension work have a good chance of success.

(A.R.R.)

A.J. Coale and C.Y. Tye, "The Significance of Age-Patterns of Fertility in High Fertility Populations", *The Milbank Memorial Fund Quarterly*, October 1961.

Net reproduction rate (NRR) of the Chinese group of Singapore population, 1956-58, is higher than that of the Malaysian group. But the crude birth rate and the natural increase rate of the Chinese group are lower than among the Malaysians. The Malaysian fertility schedule reaches peak at a lower age followed by a more steep decline at the higher ages than the Chinese fertility schedule. The mean length of generation for the Malaysian group is 26.4 years and that for the Chinese, 29.1

This apparent contradiction in the Malaysian group's higher fertility and higher growth in spite of its lower net reproduction rate is explained by showing that the procreation beginning earlier among the Malaysians contributes to their higher crude birth rate and natural increase rate in two ways: (a) early child-bearing permits some births to occur that otherwise would be prevented by mortality; (b) the births per generation are compressed into a shorter period to produce higher annual crude birth rate and higher annual rate of population growth.

Reduction in growth and fertility due to an increase in the mean length of generation is larger in high fertility and high mortality populations than it is in populations with low fertility and low mortality. Increasing the mean length of a generation of high fertility Malaysians by 27 years would bring about a reduction of 10 per cent at every age in their age specific fertility. Increasing the mean length of a generation of the United States native white population by as much as 5 years would reduce their age specific fertility by only 5.2 per cent.

If the rate of growth is negative in a population, the younger procreation and hence shorter mean length of generation will be equivalent to lower, rather than higher, fertility. This is because with a less than one net reproduction rate, a shorter mean length of generation implies a faster decline in the population.

The effect of a difference in the mean length of generation in two extraordinarily fertile populations of the world, namely, the Cocos Islanders and the Hutterites of West North America is examined. The Cocos Islanders have early marriage and early child-bearing. The Hutterites marry late. The two populations have gross reproduction rates of 4.17 and 4.00 respectively. It was found that with an expectation of life of 70 years for both populations, the Hutterites would require about 20 per cent higher fertility in their existing fertility pattern to produce the same growth rate as among the Cocos Islanders.

The significance of the difference in the mean length of generation in two populations is greater in the more favourable mortality conditions. The Hutterite population would need a gross reproduction rate of 4.49 if  $e_0$  (expectation of life at birth) were 20 years, a rate of 4.70 if  $e_0$  were 50 years and a rate of 4.78 if  $e_0$  were 70 years, to reproduce as rapidly as the Cocos Islanders with a rate of 4.00.



In addition to the long-run effect of a change in the age-pattern of fertility, the transitory effects arising out of such a change are also examined. It is found that the change from the early to the late child-bearing pattern immediately causes a reduction in the birth rate which may tend to recover after a period of transition. This results from the loss of births due to the postponement of child-bearing. If a cohort reaching age 25 this year produces all of its births and the next cohort now aged 24 waits until age 30, because of a postponement of 5 years in child-bearing pattern in the population from next year, to produce all of its births, then the total immediate loss will be the births that would normally have occurred in the five years. With births dispersed through a wider range of child-bearing ages rather than concentrated at one age, an increase of 5 years in the mean age of child-bearing produces the same total loss, but spread over a longer period of time.

The policy implication of the results of the study is that in the non-contraceptive populations the differences in age at child-bearing result mainly from differences in age at marriage. The effects of postponement of child-bearing, *i.e.*, reduction in fertility can, therefore, be brought about simply by raising the age at marriage, even if the size of family remains the same. In high fertility populations such a population policy can cause a substantial reduction in fertility and growth of population.

(M.S.)

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**B.J.L. Berry, "The City Size Distribution and Economic Development",**  
*The Economic Development and Cultural Change*, July 1961.

The two recognised city size distributions according to rank size (J. Q. Stewart) and the law of primate city (Mark Jefferson) are investigated in relation to economic development and a model of city size distribution proposed.

Out of the 38 countries treated, the city size distributions of 13 are lognormal (rank size). This includes countries as big as China and as small as Switzerland, as developed as the United States and as underdeveloped as Korea. It is observed that where economic development is lower, the proportion of larger cities becomes greater. However, the United States and Germany having developed economies, and India and China having long urban traditions also contain similar distributions.

The city size distributions of 15 countries are primate. These cases range from such underdeveloped countries as Thailand and Ceylon through countries with dual and peasant economies to those with specialised agricultural economies, *e.g.*, Denmark and Netherlands.

The city size distributions of nine countries are intermediate between lognormal and primate. In some countries, however, such as Norway and Canada lognormality predominates and in some such as Pakistan and Malaya primacy predominates. In the special case of England and Wales primate cities are grafted on top of a complete lower lognormal distribution.

The scale of degree of urbanization shows that no country is "least" urbanized. The chi-square test depicts that "there is no relationship between the type of city size distribution and the degree to which a country is urbanized." Notwithstanding certain anomalies, "countries with the lowest primacy indices have rank-size city sizes and countries with the highest have primacy city size distributions."

In countries coming out of external politico-economic dependence, a tendency is noticed towards primate cities in the form of national capitals and economic and cultural centres. Countries, claiming past empires, also tend to display primate cities in the form of empire capitals. (Vienna, Madrid, Lisbon, *etc.*). Some of the considerably industrialized countries with traditional urbanization have lower primacy and lognormally distributed city size distributions.

The proposed graphic model shows that when a few strong forces operate, primate distributions result. When, however, many forces affect the urban pattern, rank size distributions result. In the case of intermediate distributions, (a) those with more small cities than primate, (b) those with more medium cities, and (c) those with more large cities, are differentiated.

The model leads to a major hypothesis: increasing entropy is accompanied by a closer approximation of a city size distribution to rank size. When urban structure is exposed to few forces, the country is small, urban history is short, political life is simple and economic development low. When, on the other hand, complexity increases, urban functions increase more, so that at the level of highest development, specialised cities result leading to entropy.

The sub-hypotheses proposed are: urban-industrial countries such as Belgium and the United States, larger one such as Brazil, and those with traditional urbanization such as India and China have lognormal distributions. Again, larger countries like Canada and Commercially specialised ones like Australia and New Zealand have intermediate distributions close to lognormal. Small countries producing few primary commodities, such as Sweden and the Netherlands and those with subsistence commerce and dual economies such as Ceylon and Mexico, also display intermediate distributions but close to primacy. Small countries with subsistence economies such as Thailand and those with empire capitals such as Portugal have primate distributions.

Based on the scale of technological, demographic and politico-economic indices, four patterns have been proposed. Graphic representation of the first two patterns leads to the conclusion that the ranks of the developed countries are high in terms of technologic indices and low in terms of demographic indices. The conclusion that arises from the study of the graph prepared on the scale of economic-demographic development is: "different city size distributions are in no way related to the relative economic development of countries." In terms of economic development, explanation of variations of distribution from primacy to lognormality is not found.

Notwithstanding the high association of urbanization with economic development, no relationship is observed between the type of city size

distributions and either the relative economic development or the degree of urbanization of countries. When few strong forces affect the urban structure, primacy results; when, on the other hand, many forces come into play in many ways, lognormality results. Simplicity is noticed in countries having orthogenetic primate cities with dual colonial economies and heterogenetic primate cities with empire capitals. Complexity is displayed in countries with specialized economies and in those with a long history of urbanization no matter the size.

(S.A.A.B.R.)

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