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THE ROLE OF AGRICULTURE IN EMPLOYMENT GENERATION
AND INCOME DISTRIBUTION IN ASIA AND THE NEAR EAST

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August 1988

Prepared for ANE/TR/ARD Strategy Symposium
"Agriculture in the 1990s"

ABSTRACT

The Role of Agriculture in Employment Generation and Income Distribution in Asia and the Near East

Policy makers often put the question of agriculture's role in employment generation in a disarmingly simple way: how fast must the agricultural sector grow in order to absorb the new entrants to the labor force that cannot find jobs in other sectors? The notion that agriculture is the "employer of last resort" stems from conceptions of traditional agriculture rooted in dual economy models and "the moral economy of the peasant." If workers remain "behind" in the agricultural sector until they are needed in the modern industrial or service sectors, the answer is fairly simple--the agricultural sector must grow enough to provide food for the rural population to survive until workers migrate to better paying jobs, but beyond that planners will be concerned only with maximizing growth of industrial output. By raising the question, however, policy makers are, at least implicitly, raising a set of deeper and more complicated issues. The welfare levels of the rural labor force are themselves a significant part of the objective function, and welfare extends well beyond physical quantities of food available in the countryside. The real question being asked is "how fast must the agricultural sector grow to absorb the "residual" labor at constant or rising standards of living?" That is, what agricultural development strategies will raise real wages in rural areas?

The answer to this question requires a broad understanding of both the supply and demand determinants of wage formation in rural labor markets, including the extent to which a supply-demand framework is even helpful in explaining the formation of rural wages. The diversity of experience in Asia and the Near East is truly mind-boggling, and no single model or set of parameters can begin to capture either the static situation or dynamic behavior. The purpose of this paper is much more modest: a review of some basic empirical trends and patterns with respect to agricultural employment and income distribution; a rough summary of the important elements that influence the demand for

labor in the rural economy; an analysis of the instruments available to policy makers to manipulate those elements to influence income distribution, primarily through increases in real wages in rural labor markets; and a sketch of the analytical tools available for identifying key trade-offs and opportunities in the likely economic environment in the 1990s. The basic framework for the discussion is long-run equilibrium between trends in labor supply and demand leading to real wage formation in rural labor markets.

No readily available data show trends in real wages for unskilled workers in rural areas for the important countries in Asia and the Near East. Several proxies, however, provide useful glimpses at what must be happening to rural wages and are important indicators in their own right. The following variables are analyzed in the paper to provide insights into the structure and dynamics of the rural economy: the rate of increase in the agricultural labor force relative to the overall labor force; the share of the agricultural sector in GDP relative to the share in the total labor force; implied levels and changes in agricultural per capita incomes relative to those in the nonagricultural sector; changes in labor productivity in agriculture relative to those in the rest of the economy; and changes in average levels of caloric intake.

At least three relatively discrete topics need to be treated in a discussion of the relationship between the agricultural sector and patterns of employment in a country. The narrowest concern, but possibly the most significant in quantitative terms for many countries, is how many people will find jobs directly in the agricultural sector under alternative growth strategies. For countries somewhat further along in the agricultural transformation, the indirect effect on employment of agricultural growth may be more important. The employment consequences of investments in rural infrastructure (and the second-round impact on agricultural employment when output then expands), of greater volumes of marketed inputs and output processing, and of evolving consumption and investment patterns eventually dominate the direct effects of employment in agriculture. And as commodity and factor markets become well integrated between rural and urban areas, the macroeconomic and general-equilibrium consequences for employment from

changes in agriculture, especially changes in important food and agricultural prices, are likely to be the most important of the three factors influencing the relationship between agriculture and employment.

Investment in infrastructure has two important dimensions in employment generation in Asian agriculture. Rural infrastructure, in the form of irrigation and drainage works, roads, ports and waterways, communications, electricity, and market facilities, provides the base on which an efficient rural economy is built. Much of the investment needed to provide this base comes from the public sector, even when the private sector is playing the predominate role in agricultural production and marketing. Without this public investment, rural infrastructure is seriously deficient in stimulating greater production of crops and livestock, and the reduced employment opportunities are obvious. Investment by the private sector is also less profitable in the absence of adequate rural infrastructure, thus further reducing rural dynamism. The main role of investments in infrastructure in agricultural employment is no doubt through this longer-run stimulation of agricultural production.

A second role needs to be stressed as well. The investments in infrastructure themselves can generate substantial rural employment directly, and this potential has not been lost on planners seeking both long-run employment creation and short-run work programs to alleviate rural poverty or even famine conditions. "Food for Work" and "Employment Guarantee" schemes almost always are designed to build rural infrastructure using low-cost or unemployed workers. Large-scale irrigation and road construction projects offer the potential to employ vast numbers of unskilled rural laborers if project designers are sensitive to employment issues in the choice of technique and are willing to address the managerial problems that arise from labor-intensive techniques in construction.

The progressive commercialization of agriculture as more productive inputs are purchased and a greater share of output is marketed is more than just a stimulus to agricultural productivity; it also creates substantial employment in the agriculturally-

related industries. In modern economies far more workers are engaged in agribusiness than in farming itself. Unfortunately, relatively few policy instruments are available to stimulate efficient employment in the agribusiness sector. Parastatal and state-owned enterprises have a poor record of commercial viability in most of Asia and the Near East. Their employment record may be "good" in terms of numbers of workers, but labor productivity--value added per worker--tends to be very low. More efficient firms and more productive workers emerge from a competitive private sector, and stimulating the development of such firms is now a high priority of most countries in the region. Because so many impediments to the private sector have existed historically, especially in the agribusiness/marketing field, policy reforms that end barriers to private-sector participation are an important first step. But stimulating private investment while creating a competitive market structure is a delicate task, not one for which most governments have any real experience. Policies that restrict licenses to a limited number of firms in order to guarantee market share might well induce investment, but they produce an oligopolistic market structure. By contrast, an aggressive competition policy might well scare off private investors, especially domestic entrepreneurs, at least initially.

It is fairly apparent that simply "getting prices right" in the agricultural and marketing sectors does not of itself induce the necessary private investments or competitive market structure. Inappropriate price policies are like other barriers to participation by the private sector; removing them might be necessary but not sufficient, in the absence of other institutional and legal reforms, to guarantee greater involvement by the private sector. Economists are woefully ignorant of the basic causes of the "animal spirits" that motivate private investors, but the need for a competitive market structure is compelling to the profession. Businessmen are happy to explain what they need to make a profit; a government-guarantee of that profit would then lead them to invest. Striking the right balance between the two perspectives will take pragmatic experimentation with alternative policies.

The most powerful lessons on the relationship between agricultural change and income distribution are the need to stimulate agricultural productivity and to foster the intersectoral links that contribute directly to agricultural development, employment, and rising real wages. When the industrial and service sectors are growing efficiently and have strong market linkages to the rural economy, an agricultural sector that grows fast enough to raise labor productivity, combined with a price-stabilization policy that assures income gains to farmers and access to food for low-income consumers, will raise rural wages and improve income distribution. There are no tricks here; only a coherent food and agricultural policy maintained for several decades can make a sustainable difference to the poor. Managing short-run price policy to stabilize the real incomes of the poor while protecting long-run investments in the rural sector provides an important guarantee of welfare levels of the most vulnerable with the shortest time horizons. But food price policy cannot solve the problem of hunger any more than it can the problem of agricultural productivity. For both problems, agricultural development that raises real wages is needed.

Most agricultural development policies that influence rural wage formation do so via the demand side of the equation. The main instruments are investments in rural infrastructure, including irrigation with its second-round impact on multiple cropping; new technologies that raise yields, increase labor requirements, shorten the growing season, and permit a second or third crop; adequate price incentives to stimulate on-farm savings and investments and roundabout expenditure multipliers; and a favorable environment for vertical diversification, which steadily transfers workers from agriculture to industry and the service sector, even if it leaves them in rural areas (and living on the farm). These are the ingredients of agricultural development and structural change. Their successful implementation depends on a healthy relationship between the agricultural sector and the rest of the economy, in terms of both market linkages and policy balance.

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THE ROLE OF AGRICULTURE IN EMPLOYMENT GENERATION AND INCOME DISTRIBUTION IN ASIA AND THE NEAR EAST

Policy makers often put the question of agriculture's role in employment generation in a disarmingly simple way: how fast must the agricultural sector grow in order to absorb the new entrants to the labor force that cannot find jobs in other sectors? The notion that agriculture is the "employer of last resort" stems from conceptions of traditional agriculture rooted in dual economy models and "the moral economy of the peasant."¹ If workers remain "behind" in the agricultural sector until they are needed in the modern industrial or service sectors, the answer is fairly simple--the agricultural sector must grow enough to provide food for the rural population to survive until workers migrate to better paying jobs, but beyond that planners will be concerned only with maximizing growth of industrial output. By raising the question, however, policy makers are, at least implicitly, raising a set of deeper and more complicated issues. The welfare levels of the rural labor force are themselves a significant part of the objective function, and welfare extends well beyond physical quantities of food available in the countryside. The real question being asked is "how fast must the agricultural sector grow to absorb the "residual" labor at constant or rising standards of living?" That is, what agricultural development strategies will raise real wages in rural areas?

The answer to this question requires a broad understanding of both the supply and demand determinants of wage formation in rural labor markets, including the extent to which a supply-demand framework is even helpful in explaining the formation of rural wages. The diversity of experience in Asia and the Near East is truly mind-boggling, and no single model or set of parameters can begin to capture either the static situation or

1. The classic references are Boeke (1953) and Chayanov (1924, translated and reprinted 1966); the modern statements are in Lewis (1954), Fei and Ranis (1964), and Scott (1976).

dynamic behavior.² The purpose of this paper is much more modest: a review of some basic empirical trends and patterns with respect to agricultural employment and income distribution; a rough summary of the important elements that influence the demand for labor in the rural economy; an analysis of the instruments available to policy makers to manipulate those elements to influence income distribution, primarily through increases in real wages in rural labor markets; and a sketch of the analytical tools available for identifying key trade-offs and opportunities in the likely economic environment in the 1990s. The basic framework for the discussion is long-run equilibrium between trends in labor supply and demand leading to real wage formation in rural labor markets. Such equilibrium is not posited for short-run wage determination, however, which leaves scope for factors not related to supply and demand in determining the level of rural wages, employment, and income distribution in the short run.

Empirical Patterns and Trends

No readily available data show trends in real wages for unskilled workers in rural areas for the important countries in Asia and the Near East. Several proxies, however, provide useful glimpses at what must be happening to rural wages and are important indicators in their own right. The following variables provide insights into the structure and dynamics of the rural economy: the rate of increase in the agricultural labor force relative to the overall labor force; the share of the agricultural sector in GDP relative to the share in the total labor force; implied levels and changes in agricultural per capita incomes relative to those in the nonagricultural sector; changes in labor productivity in agriculture relative to those in the rest of the economy; and changes in average levels of caloric intake. Such aggregate data and the calculated trends are no substitute for detailed observations of changes in work patterns and standards of living at the village

2. The recent volume by Binswanger and Rosensweig (1981) summarizes a large empirical and theoretical landscape; it is clear that the empirical complexities with respect to the functioning of rural labor markets and wage formation presented in the country papers overwhelmed the theorists.

and household level. Even a review of the studies that exist was beyond the scope of this paper.

Characteristics of the Sample

Twelve countries provide the main focus of analysis, four each from Southeast Asia, South Asia, and the Near East. In decreasing order of per capita income (within each region) as reported by the World Bank, the countries are: Malaysia, Thailand, the Philippines, and Indonesia; Pakistan, Sri Lanka, India, and Bangladesh; and Tunisia, Turkey, Egypt, and Morocco. Several comments about the sample are in order. First, the countries are quite large. Only one country each in Southeast and in South Asia has a population of less than 50 million, and two countries in the Near East sample are about this size. Second, the range in annual per capita incomes in 1985 is substantial, from \$150 per capita in Bangladesh to \$2,000 per capita in Malaysia, and there is a relatively smooth distribution of countries in between, at least up to about \$1,200 per year. Although there is enough variance to examine the impact of different income levels on agricultural employment and income distribution, and ample variations in growth rates from 1960 to 1985 to examine the influence of growth, the range in incomes and differences in economic structure are not so great that cross-country comparisons are immediately suspect in the absence of Kravis-type adjustments. The analysis conducted here relies on levels of per capita income calculated by the methodology used in the *World Development Report* published annually by the World Bank. The countries chosen as representative of each region need little justification except for the Near East. Technically, Turkey is classified as a country in Southern Europe, but agriculturally and economically it is an important country in the broader region of the Near East. Tunisia is a small country by the standards of all the others in the sample, with less than half the population of either Malaysia or Sri Lanka. But Syria is not much larger and Jordan is substantially smaller, and both economies have been severely disrupted by conflict in the Middle East. On the whole, the country sample seems reasonably representative of the geographic area to be

treated, and it has the great advantage that comparable data from World Bank tables can be used for all the countries.³

Growth in Agricultural Labor and the Total Labor Force

The basic patterns of growth in the agricultural and total labor forces during the 1960s and 1970s are shown in Table 1.⁴ The table also reports the relative rates of growth between the two labor forces (G_{LA}/G_L). The agricultural labor force never grows as rapidly as the overall labor force, which implies that there is net migration out of agriculture. More striking, perhaps, is the wide variation in the relative rates; the fact that some of them are negative implies an absolute decline in the agricultural labor force. Not surprisingly, these patterns for the labor force are roughly correlated with per capita incomes from agriculture, as calculated from relative shares in GDP and in the total labor force (see Figure 1).⁵ A final point can be seen in Table 1: the average growth in agricultural incomes (G_{YA}) varies substantially across the three regions. Southeast Asia showed the best performance from 1965 to 1985; the weighted average rate of growth was 2.3 percent. The Near East was second with a rate of 1.8 percent. South Asia showed nearly stagnant performance, although this is heavily weighted by the slight decline in agricultural incomes calculated for India. An unweighted average would show an increase of 1.1 percent per year, still significantly below the levels of the other two regions. This relatively poor performance of South Asia shows up repeatedly in the analysis and discussion, and important questions are thus raised about the historical reasons and possible lessons for improved policies and performance in the 1990s.

Agricultural Growth and Employment in Agriculture.-- The most direct way to examine the link between agricultural growth and employment in agriculture is to

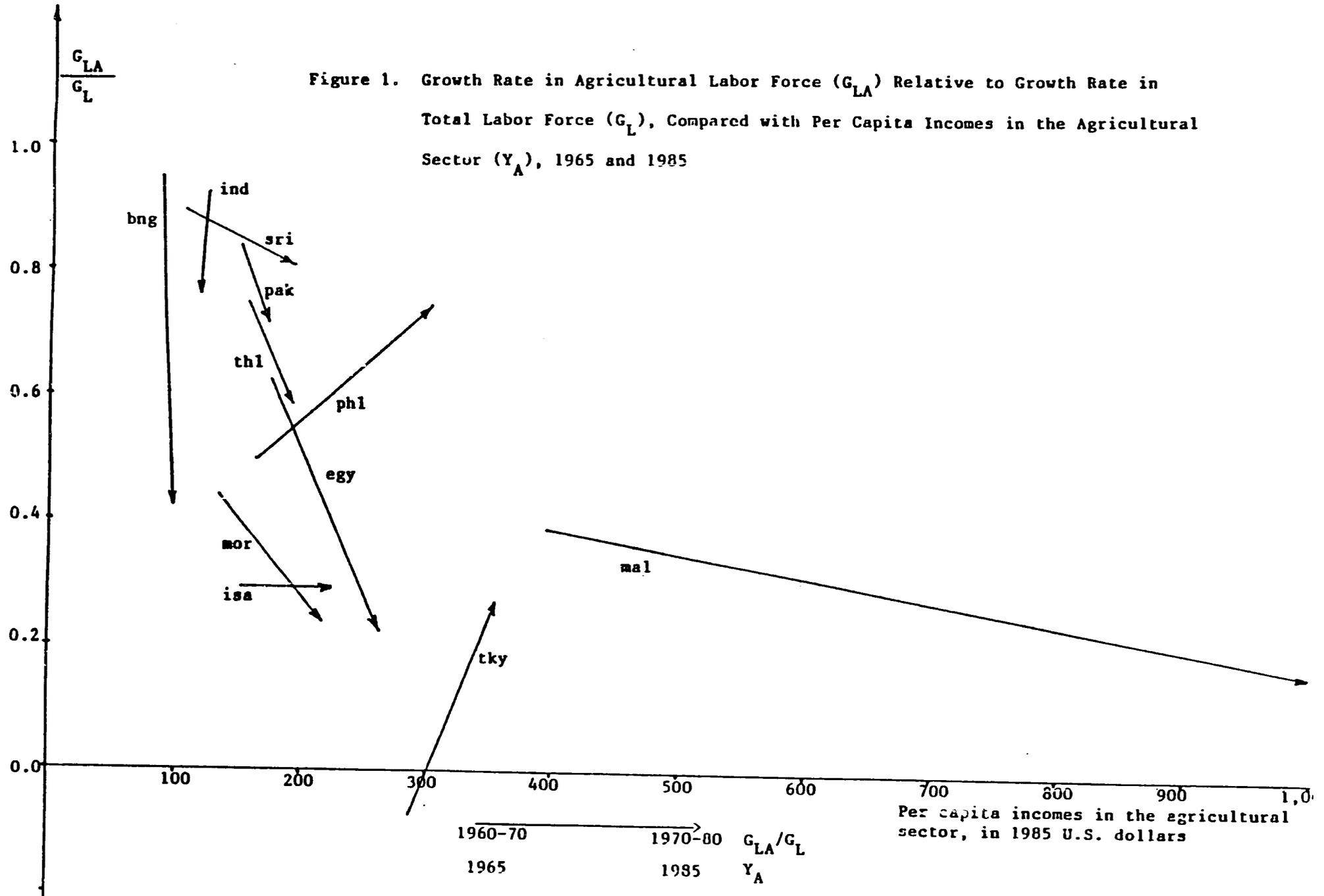
3. The country sample is the same as that used in the paper "Agriculture and Structural Change: Policy Implications of Diversification in Asia and the Near East." See Timmer (1988c).
4. Similar data cannot be presented for the 1980s until the size of the agricultural labor force is reported on a comparable basis for 1990. Reliable data draw on census reports and are available at decade intervals only.
5. The levels of agricultural income are calculated and discussed in Timmer (1988c).

Table 1. Growth Rates in Total Labor Force and Agricultural Labor Force

Region Country	G_L		G_{LA}		G_{LA}/G_L		G_{YA}	
	60-70	70-80	60-70	70-80	60-70	70-80	1965	1985
<u>Southeast Asia</u>								
Malaysia	2.8	3.0	1.1	0.5	0.39	0.17	397	1,000
Thailand	2.0	2.9	1.5	1.7	0.75	0.59	157	192
Philippines	2.2	2.4	1.1	1.8	0.50	0.75	164	302
Indonesia	1.7	2.1	0.5	0.6	0.29	0.29	164	223
					Population Weighted Average Annual Growth Rate (percent)		176	275 2.3
<u>South Asia</u>								
Pakistan	1.9	2.5	1.6	1.8	0.84	0.72	151	173
Sri Lanka	2.1	2.1	1.9	1.7	0.90	0.81	106	194
India	1.5	1.7	1.4	1.3	0.93	0.76	123	120
Bangladesh	2.1	2.4	2.0	1.0	0.95	0.42	87	100
					Population Weighted Average Annual Growth Rate (percent)		122	124 0.1
<u>Near East</u>								
Tunisia	0.7	2.9	-0.6	-0.7	-0.86	-0.24	224	578
Turkey	1.4	2.2	-0.1	0.6	-0.07	0.27	291	356
Egypt	1.9	2.2	1.2	0.5	0.63	0.23	175	265
Morocco	1.6	2.9	0.7	0.7	0.44	0.24	136	219
					Population Weighted Average Annual Growth Rate (percent)		217	310 1.8

Sources: Data from World Bank, *World Development Report, 1987* (New York: Oxford University Press for the World Bank, 1987) and World Bank, *World Tables, Second Edition, 1980* (Baltimore: Johns Hopkins University Press for the World Bank, 1980).

Figure 1. Growth Rate in Agricultural Labor Force (G_{LA}) Relative to Growth Rate in Total Labor Force (G_L), Compared with Per Capita Incomes in the Agricultural Sector (Y_A), 1965 and 1985



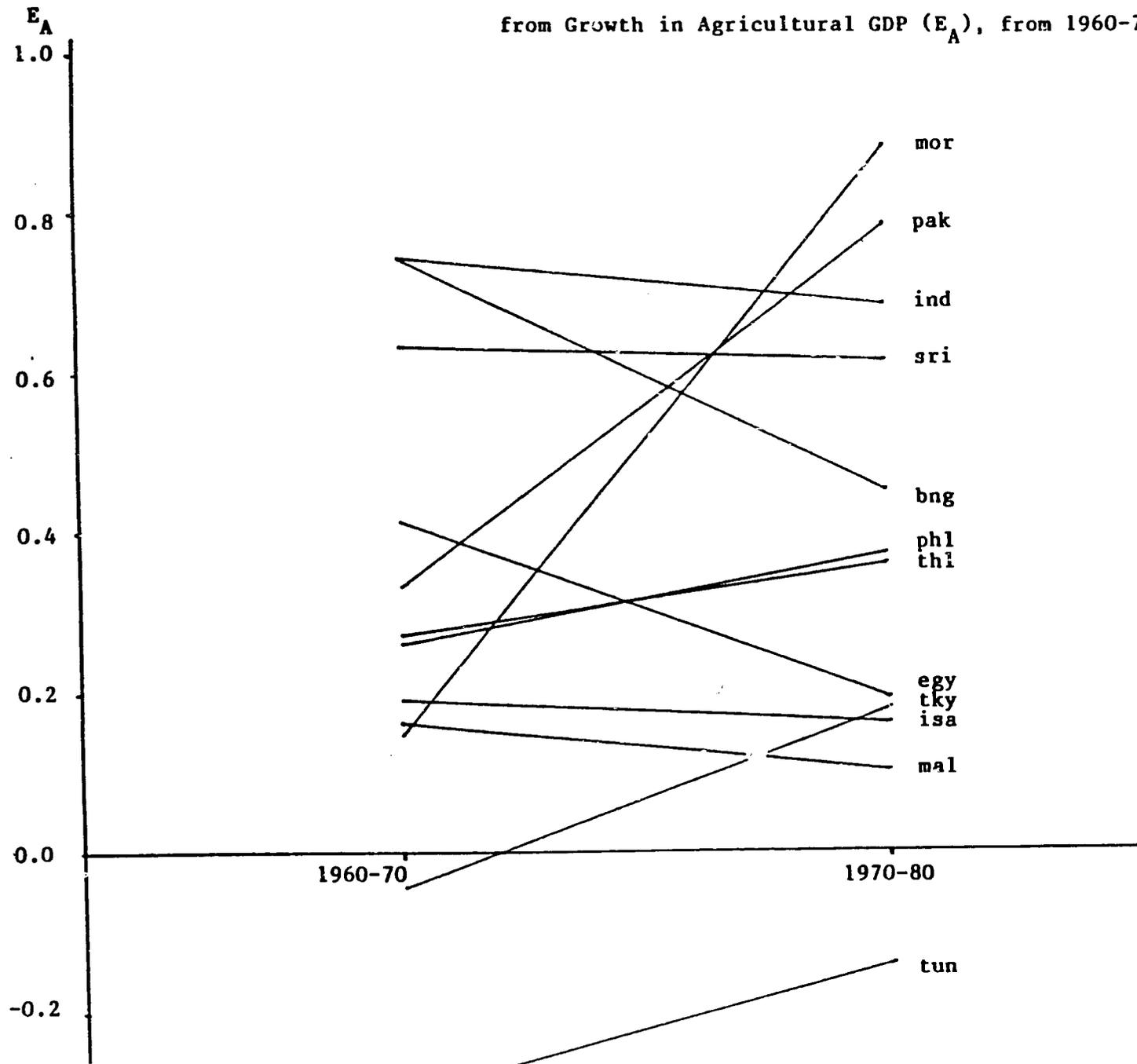
calculate the ratio of the two growth rates--the elasticity of employment with respect to GDP growth. The results are plotted in Figure 2 for the 1960-70 and 1970-80 time periods for the twelve countries in the sample. It is immediately apparent that the elasticity of agricultural employment from growth in agricultural GDP is not a simple analytical or planning concept. It ranges from -0.3 to almost 0.9 in the sample. For six countries it increased between the 1960s and 1970s; for six countries it declined. No obvious explanatory variables can account for the wide variation. Although the employment elasticity might be a useful summary statistic to describe growth patterns after the fact, it seems distinctly unhelpful in anticipating future growth in agricultural employment if there is little understanding of why the elasticity varies so much.

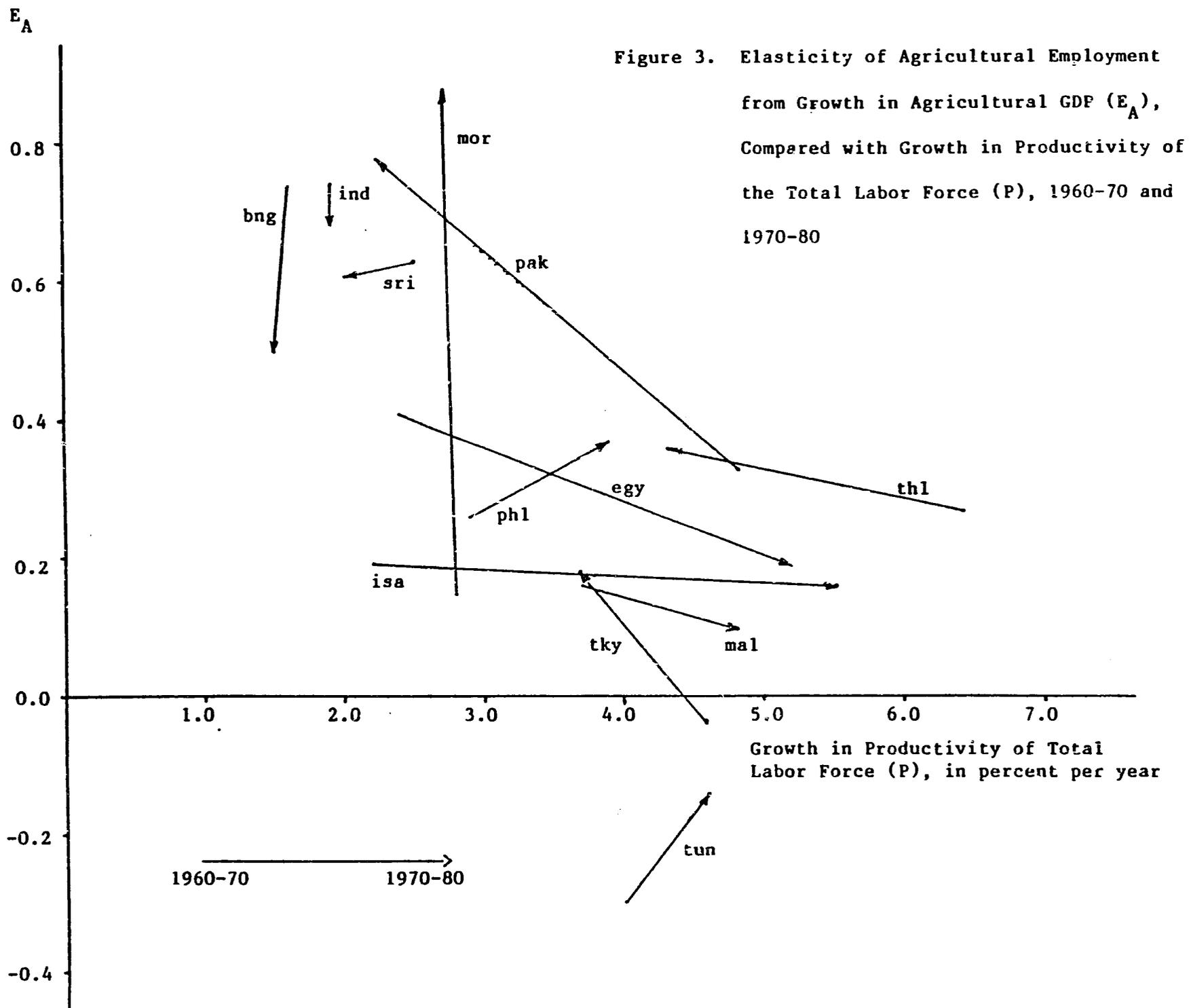
A first step in gaining more insight into this issue is to plot the agricultural employment elasticity (E_A) for each time period against the annual rate of growth in labor productivity for the entire work force (P) (see Figure 3). Labor productivity is defined as growth in aggregate GDP (G_Y) minus the growth in the labor force (G_L).⁶ In all countries for both time periods, this measure of productivity growth is positive. The lowest level was the 1.5 percent per year growth between 1970 and 1980 in Bangladesh; the highest was the 6.4 percent gain between 1960 and 1970 in Thailand. There is no clear tendency for the rate of growth in labor productivity to increase or decrease between the two periods. It increased significantly in Malaysia, the Philippines, and Indonesia but dropped sharply in Thailand. It dropped sharply in Pakistan but was nearly unchanged in Sri Lanka, India, and Bangladesh. It increased sharply in Egypt, and there were only modest changes in either direction in Tunisia, Turkey, and Morocco.

There does seem to be a negative relationship, however, between the rate of change in aggregate labor productivity and the elasticity of employment. At one level this is not surprising, because labor productivity growth is defined to mean that less labor is needed per unit of output. The relationship shown in Figure 3 is more than an accounting

6. Thus $P = G_Y - G_L$. When additional subscripts A, I, and S are used, the relationships refer to the agricultural, industrial, and service sectors, respectively.

Figure 2. Changes in the Elasticity of Agricultural Employment
 from Growth in Agricultural GDP (E_A), from 1960-70 to 1970-80





artifact, however. The elasticity measure refers to agricultural employment and agricultural GDP, whereas the labor productivity measure is for the entire work force. Equation 1 shows that the relationship is significant even after correcting for average differences between the 1960s and the 1970s and for the South Asian region.

$$\text{Equation 1: } E_A = 0.473 + 0.107 \cdot D70 + 0.284 \cdot \text{SASIA} - 0.082 \cdot P$$

(2.8)
(1.2)
(2.5)
(2.0)

where

E_A = Elasticity of agricultural employment from growth in agricultural GDP,

$D70$ = Dummy variable, equal to one for the 1970-80 time period, zero otherwise,

SASIA = Dummy variable, equal to one for observations from South Asia, zero otherwise, and

P = Average annual percent growth in labor productivity for the entire work force.

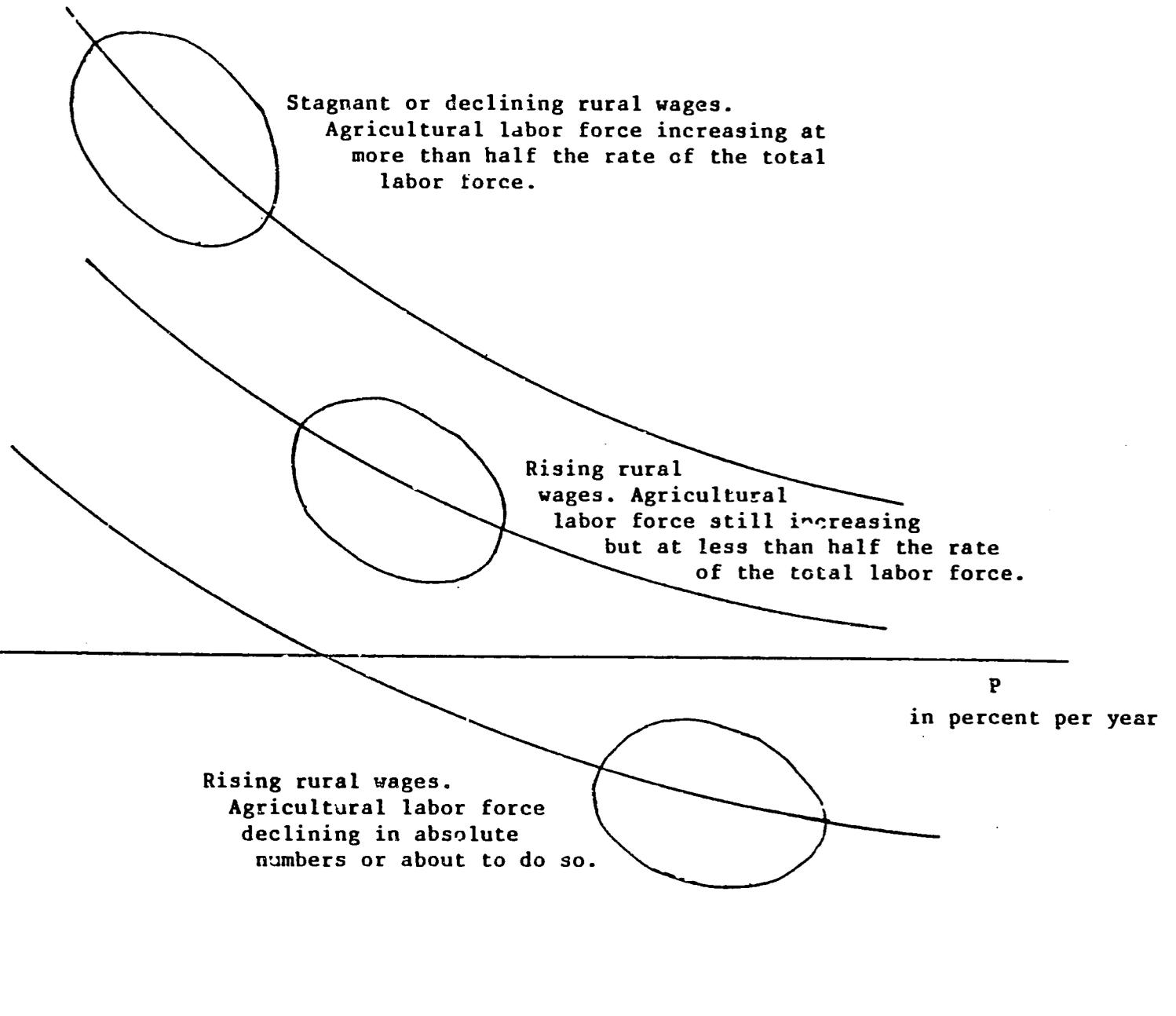
(Figures in parentheses are t -statistics)

Adjusted $R^2 = 0.50$.

More important, three separate patterns can be identified from the data in Figure 3, and these are shown schematically in Figure 4. Countries in the upper left part of the figure are primarily in South Asia, have agricultural labor forces increasing at more than half the rate of the aggregate labor force, relatively stagnant productivity of agricultural labor, and are likely to have constant or even declining rural wages. Countries in the middle segment are mostly in Southeast Asia, have rising but significantly slower growth in the agricultural labor force relative to the total, and have rising productivity for agricultural labor. Rural wages are likely to be rising or at least about to rise if productivity gains continue. Countries in the lower right part of the relationship have passed through a major turning point in the structural transformation; the absolute size of the agricultural labor force is either declining or about to decline. Significant gains in productivity in agricultural labor, when linked to rural-urban migration, imply that rural

Figure 4. Stylized Patterns of Relationships Between E_A and P

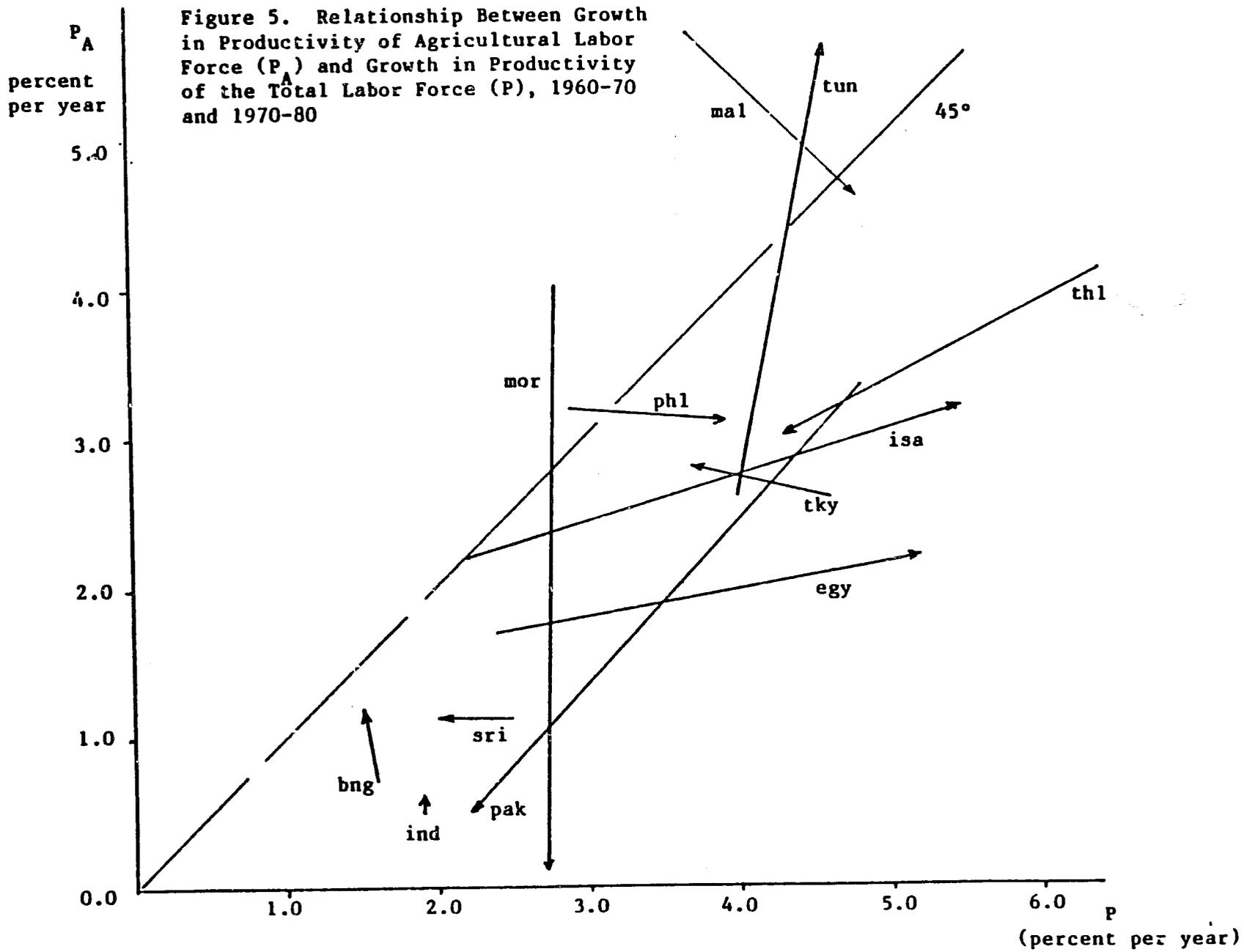
E_A



wages are rising rapidly. Only Tunisia fits the pattern clearly, but Turkey and Malaysia seem to be approaching it as well.

Labor Productivity, Wages, and Income Distribution.-- It is now apparent why the elasticity of employment in the agricultural sector is such an inadequate guide to prospective employment patterns. The elasticity depends fundamentally on changes in labor productivity in the rest of the economy, which in turn affect rural wages, migration, and labor productivity in agriculture. These complex connections can be summarized after the fact in a single number--the elasticity of employment--but the connections themselves must be understood if a clearer picture is to emerge of agriculture's role in employment generation and income distribution. The focus thus changes to the relationships between trends in employment and output growth across sectors--especially to differential growth in labor productivity among the agricultural, industrial, and service sectors. An analysis of these differential growth patterns throws considerable light on the potential for agriculture to play an active rather than a passive role in employment creation in the 1990s.

Growth in labor productivity in the agricultural sector, compared with growth in labor productivity for the entire economy (including agriculture), indicates whether the rural-urban income distribution is likely to be improving or worsening (see Figure 5). Because the share of agriculture in GDP is always lower than its share in the total labor force, growth in labor productivity in the agricultural sector must be faster on average than for the whole economy if this gross measure of rural-urban income distribution is to improve over time. Historically, such an improvement took place in most developed countries, although late-comers to the process, such as Italy, Japan and the Soviet Union, showed persistent lags in labor productivity in agriculture relative to the industrial sector, perhaps because state investments and policy-stimulated incentives were concentrated on the industrial sector. A similar lag is apparent for most of the countries in the sample examined here. Only Malaysia comes close to having its rates of growth in productivity for both periods above the 45° line, which shows equality. Only Tunisia joined that



environment in the 1970s, whereas Morocco and the Philippines departed from it, as did Malaysia marginally.

Below the 45° line in the figure, where rural-urban income distribution continues to worsen over time, two clusters of countries are apparent. The first is the group of high-growth countries with total labor productivity growing about 4.0 to 5.5 percent per year and labor productivity in agriculture increasing at roughly half that rate. This cluster includes the Philippines, Thailand, Indonesia, and Egypt for the 1970s, Turkey for both time periods, and Tunisia and Pakistan in the 1960s. Thailand joined the group from "above," as its productivity performance in the 1960s established the frontier of growth for this sample. Even after a fall in rates of growth of both agricultural and overall labor productivity in the 1970s, the Thai record remained firmly in the middle of the "good performers." The records of Tunisia and Pakistan are startling in their contrast. From roughly similar productivity performances in the 1960s, labor productivity in agriculture in Tunisia rose rapidly in the 1970s, as the absolute number of agricultural workers fell, lured out of the sector by rapid growth in the industrial and service sectors. Labor productivity in the rest of the economy in Tunisia increased only slightly, so there were clear gains in relative income distribution for the rural sector.

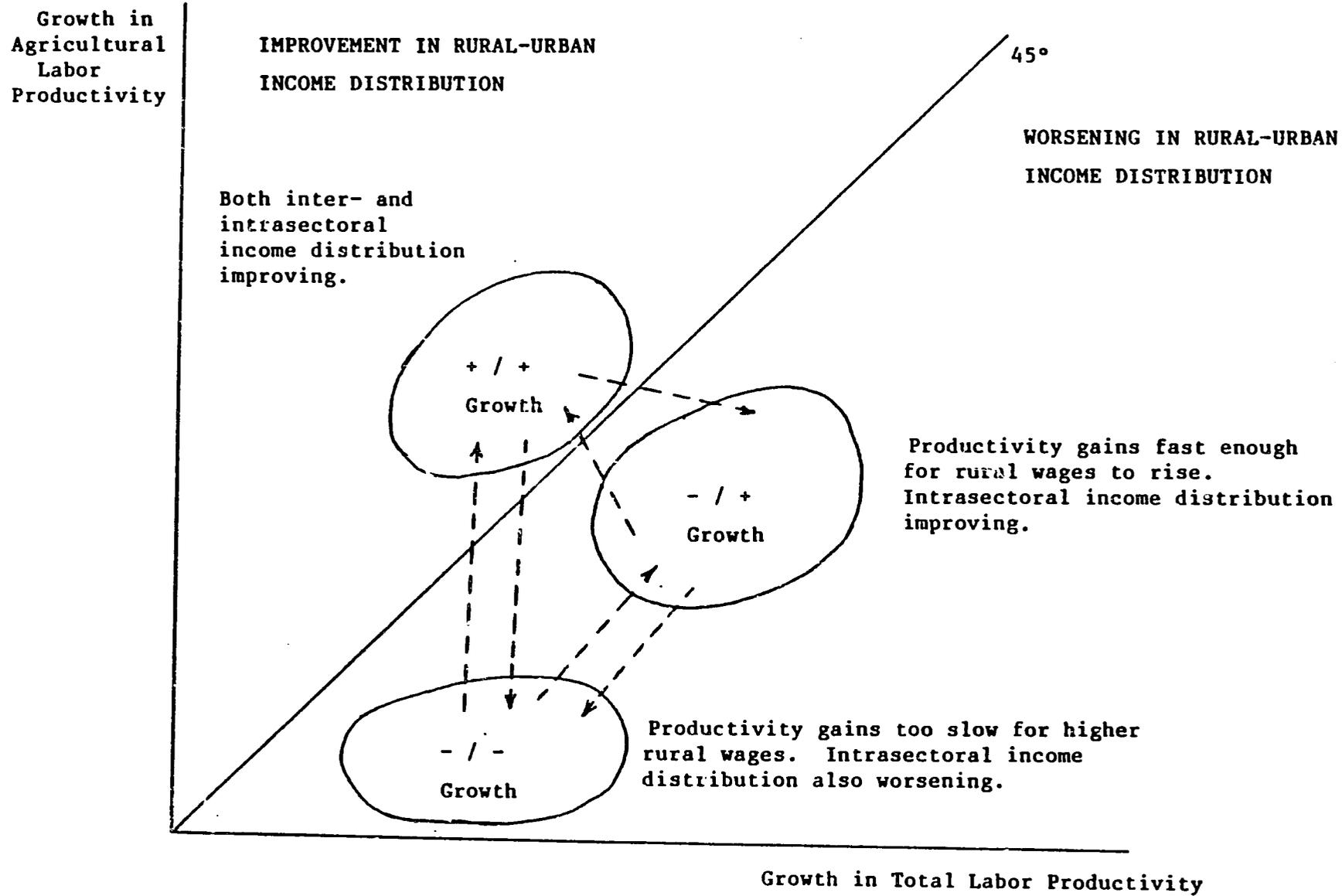
By contrast, Pakistan rejoined South Asia in the 1970s, after a decade of impressive growth in labor productivity in both agriculture and the total economy. The sudden transition strongly suggests that something other than factor endowments and population growth rates account for the differences in productivity. The total labor force in South Asia did not grow more rapidly than in the other two regions in either period. Resource endowments in South Asia are not noticeably worse than those on Java (where over two-thirds of Indonesia's population lives) or in Egypt, and yet the productivity records of both countries fit the patterns of other fast growers rather than those of South Asia. Pakistan's good performance in the 1960s argues that policies can make a great difference to productivity growth and, by implication, to improvements in real wages and income distribution.

The three growth patterns identified above are shown in Figure 6 as "+/+ growth," "-/+ growth," and "-/- growth" to indicate their likely impact on income distribution. The double positive label is attached to productivity growth above the 45° line. In this region inter-sectoral income distribution, at least as measured in this crude fashion, is improving simply because labor productivity in agriculture is rising faster than in the rest of the economy. The rapid growth in productivity in both parts of the economy translates into rising real wages, which should improve income distribution within the two sectors as well. The "-/+" region, by contrast, continues to have slower productivity growth for the agricultural labor force than for the rest of the economy; rural-urban income distribution worsens. But productivity is rising fast enough in both sectors that real wages in both sectors are likely to be rising, thus improving income distribution within the agricultural sector. When productivity growth is very slow and is concentrated outside the agricultural sector, as in South Asia, the consequences for income distribution are likely to be doubly negative, for both inter- and intra-sectoral comparisons.

Paths of Economic Growth

The interesting question is the nature of the transition paths from one region to another. Figure 6 plots the six possibilities, but Figure 5 reveals that not all possible growth paths have historical precedents in this sample. The road most traveled is from +/+ to -/+ growth, as Malaysia, the Philippines and Indonesia took this route from the 1960s to the 1970s, and Egypt was on a nearby route. Tunisia traveled the same road in the opposite direction, and Thailand and Turkey seem headed the same way. Pakistan, as already noted, fell from -/+ to -/- growth, while Morocco fell the farthest, from +/+ to -/- growth. Once in the -/- growth pattern, no country escaped in the 1970s, which suggests that either political or economic hysteresis are important factors in explaining the poor performance of South Asia. On the other hand, important changes in policy made in the late 1970s and the 1980s do not show up in the empirical record depicted in Figure 5. Bangladesh and Sri Lanka are pointed in directions that suggest they might join the +/+ cluster. Agricultural GDP in both countries grew substantially more rapidly between 1980

Figure 6. Stylized Patterns of Growth in Labor Productivity and Possible Paths Between Different Types of Growth



and 1986 than in the prior two decades; there is the possibility of a steep rise in labor productivity if the agricultural labor force grows less rapidly than the total labor force. Impressive rises in industrial and services GDP in both countries make this quite likely.

The movement from $+/+$ growth to $-/+$ growth is somewhat easier to explain. Malaysia, Indonesia, and Egypt suffered to some degree from "Dutch Disease," the relative loss in competitiveness for the tradable-goods sector during an export boom in natural resources, in this case petroleum affecting the agricultural sector in the 1970s. The significant feature in all three countries was the maintenance or improvement in rates of growth in productivity of agricultural labor, while the rest of the economy was stimulated by oil dollars. Part of the reason was the stimulus itself and the impact of a booming construction sector on rural wages. But part of the story, especially for Malaysia and Indonesia, was continued policy concern for welfare in the rural sector. Maintaining the competitiveness of traditional agricultural exports through careful macroeconomic management, either through control over inflation (Malaysia) or competitiveness of the real exchange rate (Indonesia) was an important ingredient in the good performance of the agricultural sector.

With so many countries concentrated in the $-/+$ region, the important question is how stable this growth pattern is. The major economic success stories of East Asia (Japan, Taiwan, and Korea) followed the $-/+$ growth pattern for several decades. All ended with severe cases of "structural lag." Too many resources were left in agriculture as the industrial economy spurred ahead, and they encountered major domestic and international political problems because of the price and trade policies used to raise farmers' incomes and protect the agricultural sector from foreign competition. Of the countries ending the 1970s in the $-/+$ region, only Thailand did not use similar trade and pricing policies for key commodities in an effort to protect their domestic farmers from the very low prices that occur from time to time in world markets. Although the strong performance of Thailand in terms of rising labor productivity argues that such free-trade policies promote

growth, Thailand has paid a price in terms of rural poverty. Other countries in the region have had excellent growth records but pursued different policies.⁷

Policies for the Industrial, Service, and Agricultural Sectors.-- The basic characteristic of "successful" -/+ growth is probably "start-up" industrialization through import substitution, with compensatory investment and pricing policies to maintain acceptable rates of productivity growth in agriculture. Although such early import substitution is normally stimulated through substantial, even prohibitive, trade barriers for competitive products, it may be inefficient only in a short-run, static sense. The important issue, at least in East Asian perspective, is whether trade liberalization and other efficiency-enhancing measures can convert the industrial base created by import substitution into export competitiveness. Such measures tend to be labor-absorbing, thus speeding the economy toward the turning point at which real wages start to rise. With good integration of urban and rural labor markets, or widespread rural industrialization, such policies propel the economy toward a pattern of +/+ growth. Continued heavy protection of the agricultural sector slows the transition, but it may be necessary for domestic political stability.⁸

A fall from fairly rapid -/+ growth to much slower -/- growth can also be explained in terms of linkages between industrial and agricultural policies. A capital-intensive spurt of import-substituting industrialization behind high trade barriers raises labor productivity in the industrial sector (and possibly in the service sector if government expands rapidly to manage and implement the strategy). If prior or continuing investments in the agricultural sector raise labor productivity there, the country experiences -/+ growth. But the strategy is eventually self-defeating if there is no liberalization of industrial policy and a conversion to export competitiveness. A failure

7. See Timmer (1988c) for a discussion of comparative rural poverty. See also the summary of the country papers in Sicilar (forthcoming) for a judgment on the role of pricing policies in agricultural and overall economic growth.

8. See Anderson and Hayami (1986) and Reich, Endo and Timmer (1986) for further discussion of the political economy of agricultural pricing in East Asia, its relevance to the rapidly growing economies of Southeast Asia, and the role of agricultural trading partners, especially the United States, in pressing for changes in domestic agricultural policies.

in this regard is likely to send even large economies into a -/- growth pattern. This seems to have been the fate of Pakistan between the 1960s and the 1970s, and Thailand may have followed this path in the absence of reforms in industrial policy that stimulated its growth in nonagricultural exports in the 1980s. The near-collapse of the Philippine economy after impressive growth in productivity in the 1960s and 1970s, can also be partially attributed to a failure to reform industrial policy, although the highly "extractive" nature of both industrial and agricultural policy in the early 1980s may be adequate explanation by itself.

Inter-Sectoral Patterns of Labor Productivity.-- The role of the industrial and service sectors in stimulating productivity growth in agriculture can be examined by plotting the growth rates in labor productivity for the three sectors on a back-to-back diagram. Patterns for Southeast Asia, South Asia, and the Near East are shown in Figures 7, 8, and 9, respectively.⁹ Figure 7 shows a very striking symmetry of rates of change in productivity between the industrial and service sectors in Southeast Asia. Growth in agricultural productivity, shown on the vertical axis, increased in Indonesia and decreased in Malaysia, Thailand and, marginally in the Philippines. For both increasing and decreasing rates of productivity growth in agriculture, the figure shows that whenever the rate increased in the industrial sector between the 1960s and the 1970s, it also *increased* in the service sector, usually by similar magnitude. Identical symmetry also holds between the service and industrial sectors in South Asia (Figure 8), but the entire distribution of changes is shifted downward relative to that of Southeast Asia because of lower rates of growth in productivity for agricultural labor in South Asia. The regional clusters relative to the 45° line of equal productivity growth in the respective sectors show this quite dramatically.

In Southeast Asia patterns of both service- and industrial-sector productivity growth cluster around the 45° line; industrial productivity tends to grow slightly faster than agricultural productivity and service productivity slightly slower. But the balance among

9. The regions are sufficiently different that placing all twelve countries in one diagram would have been confusing.

Figure 7. Relationships in Southeast Asia Among Growth in Labor Productivity in the Agricultural (P_A), Industrial (P_I), and the Service (P_S) Sectors, 1960-70 and 1970-80

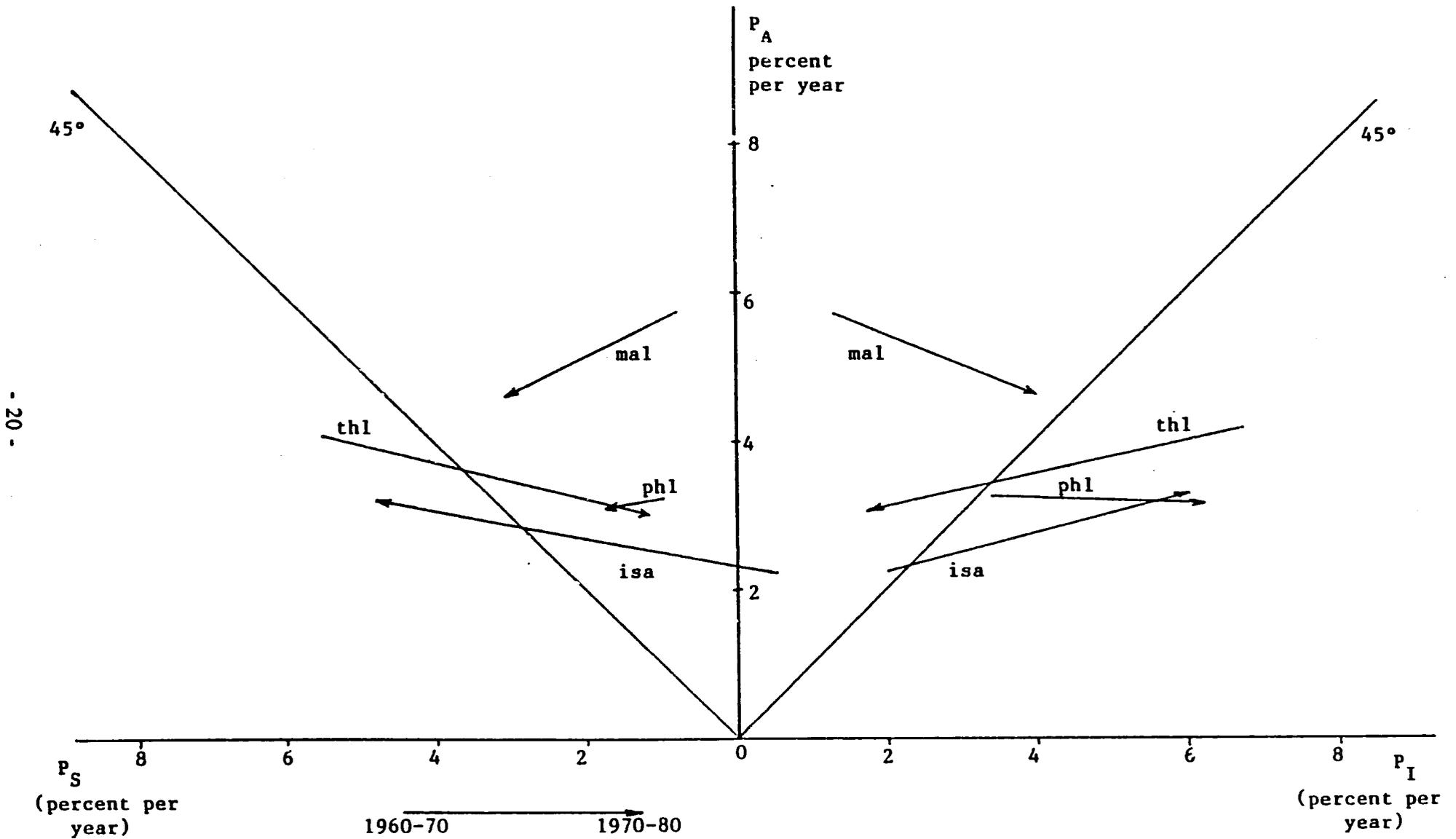
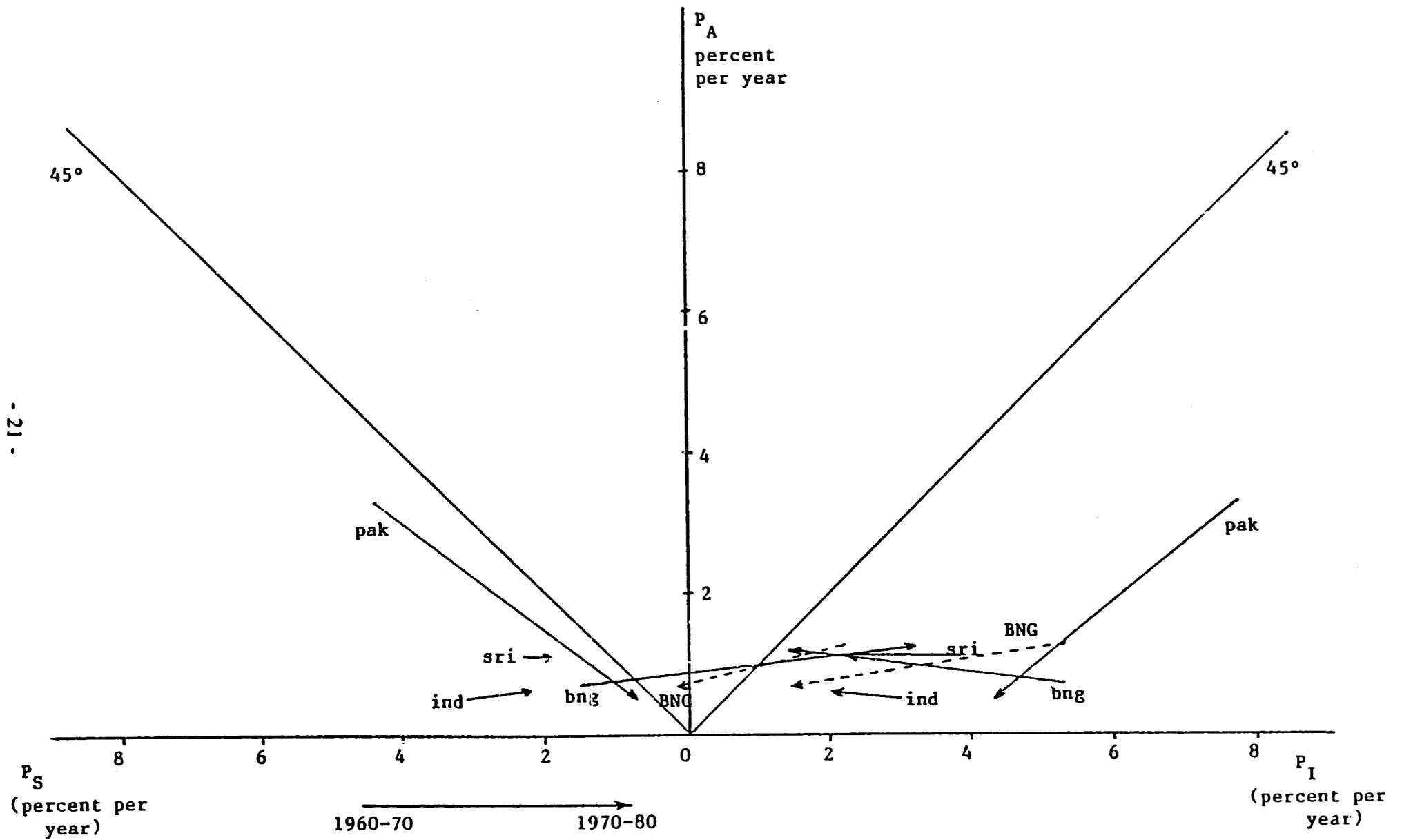


Figure 8. Relationships in South Asia Among Growth in Labor Productivity in the Agricultural (P_A), Industrial (P_I), and the Service (P_S) Sectors, 1960-70 and 1970-80



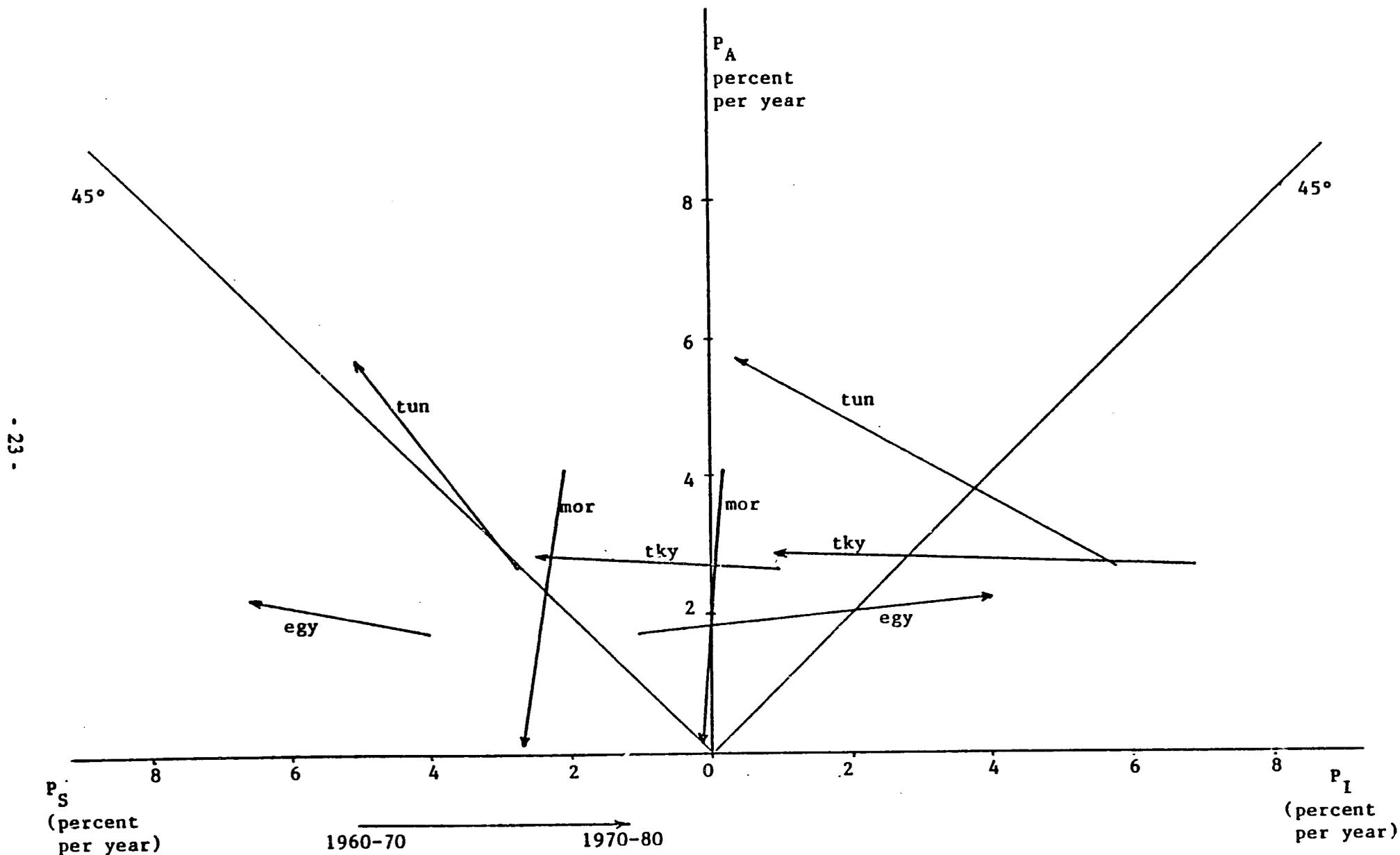
the three sectors is striking, which suggests that integration of labor markets across the three employment fields is reasonably good.

South Asia, by contrast, shows a uniform pattern of higher productivity growth for labor employed in the service and industrial sectors than that for agricultural workers. The exception is the steep drop in labor productivity in the service sector in Bangladesh for the 1970s.¹⁰ The South Asian patterns suggest that a significant dualism in labor markets still exists, and agriculture remains the employer of last resort. Again, Bangladesh seems to be an exception, but not in a positive way. The pattern of low or negative productivity growth in the service sector suggests that it has become the residual employer; agriculture is no longer able to accept more workers, even at extremely low wages. Changes in caloric availability during this period, discussed below, confirm this negative interpretation of the changes in labor productivity in agriculture and services.

Despite the contrasts in levels of productivity growth in agriculture between Southeast and South Asia, the symmetry of responses between the industrial and service sectors argues for some common mechanisms at work in the labor market. With the exception of Egypt, the patterns for the Near East do not retain this similarity (see Figure 9). For Tunisia, Turkey and Morocco, the rate of growth in industrial productivity declined between the 1960s and the 1970s at the same time that the rate of growth in labor productivity in the service sector increased in the same three countries. By the 1970s, gains were less than one percent per year for labor productivity in industry in Tunisia and Turkey at the same time that service productivity accelerated to rates higher than those in agriculture. Growth in labor productivity in services in Morocco remained significantly positive, but the rates of growth in both industrial and agricultural

10. The Bangladesh data are especially questionable. Figure 8 shows an alternative calculation for Bangladesh in dashed lines. This alternative is based on a lower share of the labor force in agriculture in 1970 than is reported in the data source used for all other data on labor force shares for 1960 and 1970, i.e., World Tables, 1980 published by the World Bank. The alternative data for Bangladesh for 1970 come from the 1987 edition of the same publication, and it is the only country in this sample with such major differences. Unfortunately, the 1987 edition does not report labor force shares for industry and services.

Figure 9. Relationships in the Near East Among Growth in Labor Productivity in the Agricultural (P_A), Industrial (P_I), and the Service (P_S) Sectors, 1960-70 and 1970-80



productivity fell to or below zero. The pattern for Egypt looks more like that of Indonesia than of any other country in the Near East or South Asia.

The presence or absence of symmetry in changes in labor productivity in the service and industrial sectors ought to be an important indicator of the nature of connections between intersectoral labor markets, but it is not immediately apparent how to interpret the results. Several plausible hypotheses about the role of government would support the inverse pattern seen in the Near East (and the "alternative" data for Bangladesh). Because government is such a large share of services in most of these countries, an inverse relationship between growth in labor productivity in the industrial and service sectors might relate to the role of government in the industrial sector. When the government role expands and government employees with relatively higher salaries are added to the service sector, labor productivity expands according to the standard definitions used in the national-income accounts, in which the "output" of the government sector is measured by its input, mostly labor. If the additional government employees cause the rate of growth in productivity in the industrial sector to fall because of their poor management, the resulting growth patterns, except for Egypt, would look like those in Figure 9. An alternative hypothesis would place less emphasis on the government sector directly and focus instead on the policies that raise labor productivity in industry. If these policies cause increases in capital intensity and a relative diminution in labor absorption, a steady stream of migrants from the agricultural sector would end up in the informal service sector instead of industry, thus lowering productivity growth in services. In this version the government is the villain only indirectly, through its policies that favor capital-intensive industrial growth.

The strong symmetry in Southeast and South Asia for the 1960s and 1970s is more difficult to explain. Changes in labor productivity in the industrial and service sectors were similar in sign and magnitude, no matter what was happening to labor productivity in agriculture.¹¹ In Southeast Asia, rates of growth in labor productivity in both the

11. The "alternative" data for Bangladesh do not show the same symmetrical pattern.

industrial and service sectors fell only in Thailand, where the growth rate in labor productivity in agriculture was also dropping between the 1960s and the 1970s. In the other three countries, the rate of growth in productivity in both the industrial and service sectors increased between the two periods. In Indonesia the rate of growth in agricultural productivity was also rising, but in Malaysia it fell significantly and in the Philippines slightly. No explanation of integrated labor markets works by itself, but this general pattern, in combination with unique aspects of each country's experience, probably provides an adequate explanation in Southeast Asia. Thus, Indonesia's recovery in growth of labor productivity in all three sectors in the 1970s is due to the rehabilitation of the economy after the chaos of the 1960s, and the relatively modest improvement in labor productivity in agriculture must be attributed to Dutch Disease. Similar macro problems explain the decrease in rate of productivity growth in agriculture in Malaysia, but pro-rural policies and investments kept the absolute rate high. Thailand suffered a sharp drop in labor productivity growth across all three sectors in the 1970s because of the oil shock and the failure of the industrial sector to absorb much labor. Only in the 1980s does the restructuring of the Thai economy seem to offer much stimulus to industrial labor absorption, but by the mid-1980s commodity prices in the world market were so depressed that substantial numbers of low-income workers remained in agriculture. The Philippines maintained a reasonable rate of growth in labor productivity in agriculture in both periods. But the acceleration in industrial productivity came primarily through inefficient import substitution, and growth in labor productivity in the service sector remained quite low, which suggests that it was the service sector rather than agriculture that was beginning to serve as the employer of last resort. Such a pattern is disconcertingly similar to that shown by the alternative data for Bangladesh.

The South Asian patterns would look very similar to the Southeast Asian patterns if labor productivity in agriculture were rising at roughly 3 percent per year instead of the observed level of less than 1 percent. But even if agriculture could be stimulated independently of the other two sectors, the arrows point the wrong way for changes in rates of growth in labor productivity in industry and services between the 1960s and the

1970s: the rates fell for all four countries in both sectors. Furthermore, the rates of productivity growth in the service sector are very low, even negative, which suggests a substantial push of laborers out of agriculture into the informal service economy. In the 1970s, the industrial sector seems not to be the direct cause of this push, because growth in labor productivity in the industrial work force was also quite low. All of the economies of South Asia apparently reached a low-level equilibrium in the 1970s, possibly under the impact of high oil prices and imports of expensive grain in combination with inefficient, protected industrial sectors, but not ones that were excessively capital-intensive. As noted above, restructuring economies with such deep problems in all three sectors involves massive changes in policy and considerable disruption to "business as usual." Even by the late 1980s, it is not clear that South Asia has found the right approaches and combinations of policies to accomplish this restructuring successfully.

The implications for the 1990s are even less clear. Tunisia and Turkey in the Near East are farther along in the structural transformation than the other countries in the sample.¹² In both cases rates of growth in labor productivity in the industrial sector fell sharply in the 1970s, whereas they increased sharply in the service sector. The rate of growth in agricultural productivity increased slightly in Turkey from modest levels, and sharply in Tunisia from similarly modest levels, as absolute numbers of agricultural workers declined. For these two countries, the patterns of growth in industrial productivity are especially perplexing because they are so significantly different from the East Asian pattern now held up as the model for developing countries. It may be that labor remittances from foreign workers during the Middle East oil boom provided the dynamism to the service sector and that labor migration stimulated the productivity gains for agricultural labor. If that is the case, the industrial sectors awaited a restructuring in the 1980s so that they, with their relatively expensive labor, would be able to compete. Without such a restructuring into skill- and knowledge-intensive manufacturing, a

12. Malaysia has a substantially higher per capita income, but its natural-resource base has permitted a much higher proportion of labor and economic activity to remain efficiently in the agricultural sector than is true of Tunisia and Turkey.

difficult task, these economies seem to run a risk of premature "hollowing," the phenomenon of deindustrialization and movement of manufacturing jobs offshore, which was first seen in the United States when the dollar was highly overvalued and more recently in Japan when the yen rose sharply. South Asia does not face this problem because its wage rates remain so low; Southeast Asia seems unlikely to face the problem because of the better balance across sectors in growth in labor productivity.

Agriculture and Employment

At least three relatively discrete topics need to be treated in a discussion of the relationship between the agricultural sector and patterns of employment in a country. The narrowest concern, but possibly the most significant in quantitative terms for many of the countries in this sample, is how many people will find jobs directly in the agricultural sector under alternative growth strategies. For countries somewhat further along in the agricultural transformation, the indirect effect on employment of agricultural growth may be more important. The employment consequences of investments in rural infrastructure (and the second-round impact on agricultural employment when output then expands), of greater volumes of marketed inputs and output processing, and of evolving consumption and investment patterns eventually dominate the direct effects of employment in agriculture. And as commodity and factor markets become well integrated between rural and urban areas, the macroeconomic and general-equilibrium consequences for employment from changes in agriculture, especially changes in important food and agricultural prices, are likely to be the most important of the three factors influencing the relationship between agriculture and employment.

Direct Effects

The "simple" question of how fast agriculture must grow to absorb surplus labor is nearly always focused on direct employment on farms, whether by owner-operators, tenants, or hired laborers. Analytically, owner-operators and tenant farmers are usually considered to provide the necessary managerial inputs, and physical labor is provided in varying proportions by all three categories. Especially in the Asian context, however, many farm households fall in all three categories simultaneously. Workers are hired during peak periods, family members seek work in rural labor markets, land is rented in and rented out, partly for convenience and partly to diversify risks, and longer-term hiring arrangements allow some managerial responsibilities to be transferred to "permanent" laborers. Accordingly, the distinctions between own-labor and hired labor tend to be fuzzy at best, which significantly undermines any analysis of "employment" in agriculture. Although it is possible to count person-days spent on various activities for different crops or livestock activities, and indeed for household activities that are directly productive to family welfare, the important question is how this total demand for labor interacts with supplies to determine real wages. In the rural labor market, the demand for labor and the supplies forthcoming are determined simultaneously through a complex process of household decision making. A critical component of this process is the perceptions among the various members of the household of the probability of finding employment off the farm, the wage that will be paid (including premiums or discounts incurred because of side agreements in other markets), and the transactions costs involved both in the job search and negotiations and in the replacement of labor in farm activities if needed. Models that assume that "the" rural wage is universally available both to employers and all household members as a basis of determining the allocation of labor among household time, on-farm work, and employment in the market are likely to provide only rough insights into rural wage formation or time allocation.

With all these provisos, what usefully can be said about the direct impact of agricultural growth on employment? First, it is important to remember the extraordinary

inertia of traditional agricultural systems. Changes in input use (including labor) from year to year that result from changed allocative or investment decisions tend to be relatively small. Weather can change the patterns in the labor market dramatically, quite literally inducing feast or famine. But with stable weather or, more practically, with widespread investments in irrigation and drainage, the continuity of employment patterns will dominate year-to-year changes even in the face of relatively rapid technical change. Inertia is not a force to be ignored in agriculture.

Attention should consequently focus on the longer-run forces likely to affect agricultural employment, primarily technical change and the diversification driven by income-related structural change. Much controversy surrounds both topics. In the early disequilibrium after introduction of the Green Revolution technology, there was considerable concern over two apparent effects. Large farmers adopted the new technology faster than small farmers, despite the apparent scale-neutrality of the technology itself. But supporting institutions--credit markets, access to irrigation, ability to procure rationed seeds or fertilizer--were not scale neutral, nor were the capacities to absorb any increase in risk from using the relatively unknown technology. Smaller farmers waited to see the reliability of the new technology and for mechanisms to develop that improved their access to the resources needed to use it. When they did adopt the new technology, however, small farmers tended to obtain higher yields than those of their larger neighbors who used less-intensive cultivation techniques. The eventual consequences of the seed-fertilizer technology for employment thus depended to a substantial extent on the average farm size in the country or region concerned.

As the seed-fertilizer technology for wheat spread into South Asia, the second effect observed was a displacement of tenant farming by mechanized owner-operations. The higher returns to land generated by the new technology, heavily subsidized tractors, and a fear of "land-to-the-tiller" campaigns all served to stimulate this trend.¹³ But mechanization and labor displacement became less of an issue when subsidies for capital

13. See McInerney and Donaldson (1974) for an early discussion of the issues and Binswanger (1978) for a later perspective

were reduced, the political momentum for land reform evaporated, and tenancy arrangements evolved to reflect the higher returns to land. Choice of technique in agricultural production is obviously critical to the employment content of a unit of output. The early experience with the Green Revolution confirmed that "getting prices right," that is, not underpricing capital relative to labor, was an important ingredient (but not the sole ingredient) in reaching the full employment potential in the new technology. Not surprisingly, this potential turned out to be substantially positive when the technology was fully adopted in the context of supporting institutions and prices.¹⁴

Prospects for agricultural employment under the impact of diversification and structural change require a separate analysis.¹⁵ The key questions are the extent of vertical diversification into a higher value-added chain from inputs to processing and distribution, a topic for the next section, and the nature of horizontal diversification into commodity production with better long-run demand prospects than exist for staple foods, with their low income elasticities. What complicates the transition from traditional agricultural systems producing subsistence crops with limited marketings, to commercial production of food staples for expanding urban and nonfarm rural markets, and finally to specialized farms but diversified agriculture, is the nature of the on-farm investments that are needed in both physical and human capital. These investments are often highly crop-specific. Given the usual low price elasticity of demand for most agricultural commodities, relatively small imbalances between farm production and market demand generate very substantial swings in commodity prices and farm incomes. Government efforts to stabilize prices, however, run the risk of inducing too large an investment into commodity production, which results in substantial delays in efficient structural change. At one level the employment consequences in agriculture are positive, because more people than are "necessary" are retained in the sector. The perceived inability of the nonagricultural sector to absorb this labor in productive jobs is one of the main reasons

14. See Hayami (1984) for a brief review of this experience.

15. Partly for this reason, the paper by Timmer (1988c) should be considered as complementary to this paper.

for the universal protection of agriculture in mature economies. But leaving people behind in agriculture, even with protected incomes, is clearly a second-best alternative to their efficient movement into more productive jobs in the nonagricultural sector. At this point, however, the discussion has to be expanded to include the indirect effects.

Indirect Effects

If macroeconomic and general-equilibrium effects on employment of changes in the agricultural sector are treated as a separate topic, the indirect effects can be discussed under three headings: the impact of investments in infrastructure; the role of vertical diversification and a growing economic share for input markets and output processing and distribution; and the influence of changing patterns of consumption and investment on employment as agricultural incomes change. Each topic is a major research field in itself. The discussion here merely reviews the nature of the issues from a policy perspective.

Investments in Infrastructure -- Investment in infrastructure has two important dimensions in employment generation in Asian agriculture.¹⁶ Rural infrastructure, in the form of irrigation and drainage works, roads, ports and waterways, communications, electricity, and market facilities, provides the base on which an efficient rural economy is built. Much of the investment needed to provide this base comes from the public sector, even when the private sector is playing the predominate role in agricultural production and marketing. Without this public investment, rural infrastructure is seriously deficient in stimulating greater production of crops and livestock, and the reduced employment opportunities are obvious. Investment by the private sector is also less profitable in the absence of adequate rural infrastructure, thus further reducing rural dynamism. The main role of investments in infrastructure in agricultural employment is no doubt through this longer-run stimulation of agricultural production.

16. See Ahmed (1988) for a review of the issues regarding investment in infrastructure.

A second role needs to be stressed as well. The investments in infrastructure themselves can generate substantial rural employment directly, and this potential has not been lost on planners seeking both long-run employment creation and short-run work programs to alleviate rural poverty or even famine conditions. "Food for Work" and "Employment Guarantee" schemes almost always are designed to build rural infrastructure using low-cost or unemployed workers. Large-scale irrigation and road construction projects offer the potential to employ vast numbers of unskilled rural laborers if project designers are sensitive to employment issues in the choice of technique and are willing to address the managerial problems that arise from labor-intensive techniques in construction.

Planners of rural construction projects, especially in the context of relief works operating with short planning horizons and under extreme budget constraints, often need to know the net employment and income that is generated by the hiring of an additional worker on the relief project at the prevailing rural wage. Such projects have been criticized because they bid workers away from alternative jobs or household activities, so the net gain is significantly less than the value of the public-works wage bill paid. Ravallion (1987) constructed a simple model to examine this issue and concludes as follows:

Thus an increase in rural public works employment will displace at least some employment in agriculture. When the level of urbanization . . . is low the outcome will resemble a full employment equilibrium in which the displacement will be close to one-to-one; total rural employment will be invariant to the size of the public works programme. For a country such as Bangladesh, the level of urbanization . . . is about 20 percent, while the elasticity of demand for agricultural labour is probably in the region of -0.7 to -0.2. Thus . . . the displacement effect will be between 50 and 80 percent; the increase in total employment will be between 20 and 50 percent of the increase in rural public works employment

Turning to wages and rural incomes, . . . when the modern sector wage is institutionally fixed, the marginal effect of an increase in public works employment on total rural income . . . is identical to its effect on the agricultural wage; both are positive The range of figures considered plausible . . . for Bangladesh imply that the marginal effect of an extra job on rural income will exceed the wage rate, and it will do so by quite a wide margin whenever the level of urbanization is low and/or agricultural labour

demand is fairly wage inelastic [With plausible parameters] an extra job in the rural sector will raise rural income by a factor of 2.5 times the wage rate for the job (pp. 170-71).

Despite the dampened effect on *employment creation* from public-works programs due to adjustments in a well functioning rural labor market, the *income effects* are highly leveraged. This merely re-emphasizes the need to focus policy attention on real wages and incomes and not on employment levels *per se*. Employment is a means to an end but is not the end in itself.¹⁷

Input/Output Marketing, Processing, and Distribution.-- The progressive commercialization of agriculture as more productive inputs are purchased and a greater share of output is marketed is more than just a stimulus to agricultural productivity; it also creates substantial employment in the agriculturally-related industries. In modern economies far more workers are engaged in agribusiness than in farming itself.¹⁸ In the less-developed agricultural economies of Asia and the Near East, such nonfarm but agriculturally-linked employment is not quite so important. Even so, the single most important sector of the industrial labor force is usually in agricultural processing. Employment in rice or wheat milling, jute mills, cotton spinning and weaving, and cigarette manufacture is often the main source of organized factory jobs. When small-scale traders, food wholesalers, retailers, and peddlers are also included, the volume of indirect employment begins to rival direct employment on farms. Many of the workers are the same, or at least from the same household. Half of the income for farm households on Java now comes from off-farm labor. Not all of the jobs are in large- or small-scale agribusiness, of course, but most are linked at least indirectly to the health of the rural economy (or the strength of the urban construction industry).

17. This conclusion must be modified, perhaps significantly, when the satisfaction from employment is a large and separable factor from the welfare gained from spending the income generated from the employment. Although the sense of self-worth gained from productive employment on a public works project may be important, the benefits from higher real wages are probably more important because of their more widely spread effects.

18. In modern agriculture, farming is often included in the agribusiness sector because of the sophisticated management skills required and the capital intensity of operations.

Relatively few policy instruments are available to stimulate efficient employment in the agribusiness sector. Parastatal and state-owned enterprises have a poor record of commercial viability in most of Asia and the Near East. Their employment record may be "good" in terms of numbers of workers, but labor productivity--value added per worker--tends to be very low. More efficient firms and more productive workers emerge from a competitive private sector, and stimulating the development of such firms is now a high priority of most countries in the region. Because so many impediments to the private sector have existed historically, especially in the agribusiness/marketing field, policy reforms that end barriers to private-sector participation are an important first step. But stimulating private investment while creating a competitive market structure is a delicate task, not one for which most governments have any real experience. Policies that restrict licenses to a limited number of firms in order to guarantee market share might well induce investment, but they produce an oligopolistic market structure. By contrast, an aggressive competition policy might well scare off private investors, especially domestic entrepreneurs, at least initially.

It is fairly apparent that simply "getting prices right" in the agricultural and marketing sectors does not of itself induce the necessary private investments or competitive market structure. Inappropriate price policies are like other barriers to participation by the private sector; removing them might be necessary but not sufficient, in the absence of other institutional and legal reforms, to guarantee greater involvement by the private sector. Economists are woefully ignorant of the basic causes of the "animal spirits" that motivate private investors, but the need for a competitive market structure is compelling to the profession. Businessmen are happy to explain what they need to make a profit; a government-guarantee of that profit would then lead them to invest. Striking the right balance between the two perspectives will take pragmatic experimentation with alternative policies.

Patterns of Consumption and Investment -- Changes in agricultural incomes might have different consequences for employment than equivalent changes in urban incomes

because of systematic differences in how farm households spend, save, and invest their incomes. Substantial variations exist in rural expenditure patterns from country to country, and the source of income might make a difference. Some sources of income are more secure than others. Remittances from a relative with a government job in the city provides more regular income than from rainfed crops on fragile upland soils. Irrigated rice or wheat might be less risky than disease-prone poultry. Rural employment off the farm might be highly seasonal and uncertain.

Even with all the complexities and cross-country variations, however, rural households in general have systematically different spending and investment patterns, and the differences have consequences for employment. Typically, the savings rate from farm incomes is higher than from nonfarm incomes whenever on-farm investments offer high rates of return. In the absence of efficient financial intermediation, however, depressed farm profitability leads fairly directly to depressed farm savings and investment. The dynamic consequences are twofold. First, farm incomes grow more slowly than otherwise, thus affecting household welfare directly and growth in employment indirectly, as reduced expenditures are translated into lower demand-led growth in output. Second, the reduced investments lower demand for construction workers, carpenters, and traders providing the factors and inputs needed to translate financial investments into physical (and human) capital. Slower growth in agricultural incomes causes a progressively larger diminution in growth in rural employment through these dynamic effects of investment.

Altered patterns of consumption tend to reinforce these dynamic effects. Farm households in general spend their incomes on goods and services with greater employment content and smaller foreign-exchange content than do their urban cousins. This is partly because they are poorer and domestically produced food forms a larger share of farm budgets. It is partly because relative prices are different in town and country. Imported goods cost relatively more in rural areas and local handicrafts and artisanal services cost relatively less. Normal responsiveness to price lowers the import content and raises the employment content of rural expenditures, which is partly because spending multipliers

from rural expenditures are high. Poor financial intermediation makes the export of savings to the urban sector fairly inefficient. Income is either spent on goods and services directly, thus creating incomes for other parties which are spent in similar fashion, or they are saved and invested directly. The positive consequences of such investments for employment have already been stressed.

Analysis of the impact of rural consumption and savings patterns begins to stretch the notion of indirect effects of agricultural change on employment. While it seems legitimate to place these employment effects in this category when the focus is on the rural labor market and work force, the consequences no doubt also spill over into urban labor markets. At this point, however, a macroeconomic perspective is needed to provide a workable analytical framework.

Macroeconomic and General-Equilibrium Effects

The agricultural sector is important to macroeconomic outcomes even in rich countries. In the much poorer countries of Asia and the Near East, changes in agricultural output or prices can be a leading factor in the level of overall economic activity, the distribution of income and food intake, and the degree of internal and external balance in fiscal and foreign-exchange accounts. Wherever production and prices of the staple food grain remain an important determinant of both farm incomes and the real wage, changes in food-grain availability have a roundabout influence on employment and income distribution by altering the level of macroeconomic activity and the competitiveness of the country's exports of labor-intensive products, including traditional primary commodities. Instability in food prices can also alter expectations and patterns of investment and have significant effects on the rate and distribution of growth. The discussion below puts these three topics--macroeconomic effects of price-induced changes in real wages, food-price stability and expectations, and agriculture in a general-equilibrium framework--in a policy perspective rather than in the context of the large volume of research now ongoing in this field.

Food Prices and Real Wages-- The productivity of a country's agriculture with respect to output of the basic grain can be an important determinant of the real wage even in the context of free trade in that grain. For rice, the most expensive of the food grains, the range between an f.o.b. export price and a c.i.f. import price is 10 to 20 percent on average. This spread translates into a significant cost difference for labor-intensive exports for which wages make up a substantial fraction of total costs. Unskilled laborers often spend more than half their incomes on rice. Several countries in the region have flipped back and forth between importing and exporting rice, including Indonesia, the Philippines, and India. The implied shifts in the real wage would have altered the profitability of hiring unskilled workers if the border prices had been completely transmitted into the economy and nominal wages were sticky.

All the Asian countries in the region, however, attempt to stabilize their rice prices relative to the border price and relative to shifts between importing and exporting status. In the face of such a stabilization policy, especially when self-sufficiency is an explicit goal of policy, the productivity of the food-grain sector is doubly important. When production lags behind domestic demand at f.o.b. export prices, only direct subsidies can keep the level of domestic prices from moving up to the c.i.f. import equivalent. At this higher level, domestic production would be stimulated and imports would be profitable if any gap remained relative to consumption. But real wages are higher than when rice prices were at export parity, or real income and living standards must fall. At this point Asian countries have faced a difficult dilemma if rice production is still below demand. They have a choice. They can either continue to raise prices to stimulate production and reduce consumption--but raise real wages and lower the competitiveness of labor-intensive exports. Or they can import rice to maintain lower prices and real wages--but face greater exposure to an unstable world rice market. The rapidly growing economies of East Asia--Japan, Taiwan and Korea--opted for the latter strategy until incomes were high enough that rice was a small component of workers' expenditures, and they then switched quickly to the other strategy. Prices were stabilized, even kept below import parity

prices, when imports were required, but large budget subsidies and government controls on rice trade were needed.

Rice-exporting countries ought to have a significant competitive advantage in developing labor-intensive exports because of the low cost of the primary wage good. Only Thailand fits the description clearly. The wage good in Egypt and Pakistan is wheat, and no other country in the sample is a regular exporter of rice. Perhaps not coincidentally, Thailand's agricultural diversification and surge in manufactured exports came primarily when export prices for rice were depressed for a number of years in the 1980s.

Food Prices and Macroeconomic Stability-- Agriculture is a major source of instability for most developing countries, and most policy makers seek interventions that would dampen its causes and consequences.¹⁹ Three major issues are important in this context: the relationship between instability in domestic production of the important crops, especially the primary food and export crops, and instability in prices for the same commodities in world markets; the impact of instability on expectations and investments; and the impact of price instability on macro stability via Keynesian shifts in consumption and aggregate demand. All three issues have links to short-run and long-run levels of employment and to income distribution, especially the component involving food consumption.

There is little point in isolating a country from the instability of world prices via self-sufficiency for its key foodstuff if domestic production of the commodity is even more unstable. The irrigated rice-based economies of Southeast Asia tend to be quite stable from year to year, but even in these circumstances production can deviate by plus or minus 5 percent from trend several times a decade. In the monsoon-dominated agricultures of South Asia, the fluctuations are substantially larger. The patterns in the -----

19. The economic rationale for the great concern that policy makers demonstrate for stability in food prices and in macroeconomic trends is discussed more fully in "Agricultural Prices and Stabilization Policy" a paper prepared for the USAID/ANE conference "Agriculture in the 1990s." See Timmer (1988a).

Near East are quite varied, as variance in Egypt's production resembles that in Southeast Asia, and Morocco and Tunisia resemble South Asia.²⁰ The policy question is how to cope with the inherent instability of nature and world markets in the most efficient manner possible, recognizing that placing all of the burden of adjustment on domestic producers and consumers is neither politically feasible or economically desirable. The consequences of the alternatives for employment are not completely obvious. Investing in additional domestic capacity to produce rice in excess of the level of average consumption probably has a net positive impact on employment directly and indirectly. But generating the foreign exchange needed to finance a greater role for imports also generates employment. The question comes down to which employment effect is greater when each strategy is used as a mechanism for coping with instability. Unfortunately, standard models of allocative efficiency provide few insights into the dynamic and macroeconomic dimensions of price instability, which places the evaluation of policy instruments to dampen such instability on very shaky analytical ground.

The major failure of the models on the dynamic side is their inability to reflect the impact on expectations and investment of instability in food prices and the macro economy. The analytical and empirical underpinnings to investment functions are very weak even in well developed economies with sophisticated firm-level data sets and long time series of historical observations by sector. In developing countries in which capital markets are segmented, entrepreneurship is nascent, and time horizons tend to be very short, knowledge of the factors influencing the magnitude and sectoral allocation of investment is poor indeed. Policy makers act as if substantial instability is a serious impediment to domestic investment, and certainly plausible behavioral models for investors could easily be built that would be consistent with such a view. Especially in the context of an increasing role for the private sector in the economies of Asia and the Near East in the 1990s, the role of effective stabilization policy as an inducement to private investment needs to be clarified in the near future.

20. The paper prepared on irrigation by David Seckler for the USAID/ANE conference discusses some of the reasons for these diverse patterns. See Seckler (1988).

Such stabilization policy extends beyond food prices. Most of the economic literature on stabilization grows out of Keynesian models of macroeconomic activity and the potential role of government interventions to prevent periodic slumps and thus raise the average rate of economic growth. In the current context, the important issue is the connection between these two elements of stabilization policy. Keynesian unemployment can be generated even in relatively poor economies if the industrial sector grew up in response to protective barriers designed to promote import substitution. Industrial firms in such a setting are dependent on domestic demand to sell their output. If food prices rise sharply, consumers of industrial goods must reallocate their budgets to protect the level of food intake, thus lowering demand for industrial products. Because rises in food prices can be sudden and large, the corresponding demand effect on the industrial sector can be similarly abrupt. There is no time to adjust investment levels and a limited financial capacity to build inventories. The result is a substantial and sudden layoff of industrial workers.²¹

The wage and employment effects discussed so far have drawn primarily for their insights on simple partial-equilibrium and macroeconomic models. The availability of computable general-equilibrium (CGE) models with structural characteristics resembling developing countries makes it possible to address the issues from this broader and theoretically more satisfying perspective. The CGE models presently available, however, have only limited ability to capture the employment and income distribution consequences of the types of changes in the agricultural sector that are discussed in this paper. The following argument has to be primarily intuitive and speculative.²²

Two crucial lessons emerge from efforts to model the general-equilibrium consequences of agricultural changes. First, how rural labor markets clear--whether through changes in nominal wages (the "neoclassical" solution) or through varying levels -----

21. See Taylor (1980) for the clearest explanation of these macro linkages between employment and food prices.

22. Two recent efforts to model some of these linkages should be noted: de Janvry and Sadoulet (1987) and Chenery, Devarajan, Go, and Lankes (1988). The latter model attempts to capture longer-run structural changes in an economy by incorporating sectoral investment functions and policy-influenced levels of factor mobility and technical change.

of under- or unemployment (the "structural" solution)--determines the primary impact on employment and income distribution. If labor markets in rural areas do not reach price-quantity equilibrium in the short run, CGE models have a difficult time tracing the next stage of economic impact into the rest of the economy except in fairly ad hoc fashion. Consequently, the current state of empirical knowledge of rural labor markets means that CGE models can be of only limited usefulness in understanding the employment and income distribution consequences of short-run instability in agricultural output or prices. Their insights are conditioned by the nature of assumptions made about the rural labor market rather than by in-depth understanding of how such markets actually work.

Price-quantity equilibrium in rural labor markets is much more justifiable as an assumption for long-run analysis, and most CGE models are designed to operate in this time horizon. Unfortunately, the second lesson from experience with CGE models has been their sensitivity to how investment is specified in generating growth patterns of employment and income distribution. Because knowledge of the functional determinants of the level and sectoral allocation of investment is so limited, most investment functions have been extremely simple and ad hoc. But differential savings rates by sector and source of income, links between type of investment and subsequent productivity gains, and the role of learning by doing as a source of technical change in both industry and agriculture vastly complicate the actual functional relationships if they are to reflect adequately the likely general-equilibrium consequences of price and output changes in the agricultural sector.

The limited analytical knowledge in these areas means a bit of speculation is in order at this stage. General-equilibrium consequences of agricultural changes are likely to differ from partial-equilibrium and macroeconomic consequences in at least several dimensions, especially through trade and foreign-exchange effects, impact on the government budget, and the sectoral allocation and level of employment. None of the differences is likely to be strongly counter-intuitive, and the extent to which they are often reflects specification problems with the CGE model that contradicts intuition based

on simpler models and in-depth familiarity with the markets and issues in question. Important insights are to be gained by keeping the world in general-equilibrium perspective, and continued development of CGE models is essential to building these insights. But equally important is building the functional understanding of the crucial relationships that determine whether the models reflect reality or assumptions. There is no substitute for finding out how rural labor markets work, how well they are connected to urban labor markets, what motivates savers and investors, and how serious the market failures in credit, information, and risk really are to rural and urban decision making.

Agriculture and Income Distribution

The nature of a country's agricultural economy influences its income distribution in three primary ways: through the distribution of land; through the impact of agricultural productivity on real wages; and through the level and stability of food prices. These three topics are intertwined and each has been the subject of separate fields of analysis.²³ This section focuses on the nature of the mechanisms that make both short-run and long-run income distribution such complicated topics. The goal is to explain why reaching and helping the "poorest of the poor" in a sustainable fashion requires more than good intentions and legislative mandates.

Economic Mechanisms and Policy Approaches

It is hard to imagine that a country in which agricultural land is owned and operated predominantly by smallholders, their labor productivity is high, and food prices are low and stable would have pressing problems of poverty and poor distribution of income. In some important sense, this description defines away the problem, because assets are fairly distributed, incomes of farm households are adequate, and even the poor -----

23. Fields (1980) presents a general introduction to the relationship between income distribution and development. More specific treatments of the role of agriculture are found in Mellor (1976), Mellor and Johnston (1984), and Morris and Adelman (1988).

have stable access to low-cost food. Problems do remain, however. The poor have basic needs other than food, farms might be too small to support large and growing families, labor productivity might be threatened by population growth and inadequate development of new technology, and the "cheap food" policy might be very expensive to the budget. All the countries in the region of Asia and the Near East would like to be in the imaginary position just described; it would vastly simplify agricultural policy making by permitting a single-minded attention to stimulating technical change and growth in productivity. The countries discussed here do not have this luxury (although some are obviously better situated than others). They must worry simultaneously about income distribution and poverty alleviation while they try to maximize economic growth. The growth-equity trade-off has been a staple topic for analysis by development economists for decades. Despite important opportunities for improvement in both dimensions in countries with seriously distorted economies and poor policies for development, the trade-off remains real and difficult in the short run for many rural economies. The "food price dilemma," for example, exists even when there are growth- and equity-enhancing changes in policy that might be made in the industrial arena.²⁴

The relevant question for policy is whether a country should strive for better "initial conditions" by undertaking land reform, should concentrate on rapid improvements in labor productivity and real wages, or should attempt direct programs of poverty alleviation to improve the distribution of basic goods and services. There are trade-offs among the three possibilities, if for no other reason than the government's budget has many claimants. But the trade-offs run much deeper, into the basic economic and political mechanisms that dictate how a country's economy produces and distributes output. Land reform is a political exercise with surprisingly few solid economic underpinnings.²⁵ While granting the desirability of more equal distribution of land, most

24. See Timmer, Falcon, and Pearson (1983), especially chapters 5 and 6 for a discussion of the relationship between the food price dilemma--low food prices help poor consumers but imperil incentives to farmers and thus lower growth in agricultural output and employment--and other policy options in the rest of the economy.

25. This is a controversial statement. It stems from a review of the debate over the desirability of a land reform in the post-Marcos Philippines. Although nearly all economic analysts support some form of land reform, they do so primarily for

policy makers will want to know if progress on improving income distribution can be made in other dimensions.

At least three paths are open, with progressively longer time horizons: guarantee access to and stability of food consumption by the poor; focus rural investments on projects and programs that stimulate the demand for unskilled labor and raise real wages; and provide incentives for the rural population to invest in human capital, including formal schooling, learning by doing, and a switch from quantities to quality of children. The latter path is no doubt the most important over the long term, but it takes us substantially outside the main themes of this paper.²⁶

The role of the agricultural sector in stimulating employment and raising rural wages has already been discussed. The consequences of rising real wages on income distribution are fairly immediate. In most dual economy models of development the critical turning point for income distribution occurs when surplus labor is absorbed, real wages begin to rise, and profits stop expanding as a share of national income. More important than this indicator of relative income distribution might be the rising per capita consumption and real welfare implied by higher wages. From this perspective, rising wages are a vehicle for sustaining improvements in consumption. Short-run gains in consumption via direct policy interventions are not irrelevant, but sustainability is a very serious issue.²⁷ An agricultural development strategy that succeeds over the course of a decade or longer in raising rural wages would almost certainly improve income distribution within the rural sector.²⁸

political reasons. The recent "neo-neo-classical" literature on interlinked markets has significantly undermined the earlier Marshallian view that only owner-operators could use land efficiently. Without strong efficiency gains, the economic case for land reform becomes much weaker, especially if substantial disruption occurs to established patterns of input supply and output marketing.

26. The papers by Schultz (1988) and Behrman and Deolalikar (1988) in the Handbook of Development Economics, Vol. I expand on the human capital dimension of the development process.

27. See Lal (1985), especially the discussion of basic needs on pp. 100-102, for a forceful exposition of the role of productive employment in guaranteeing the sustainability of consumption gains.

28. Raising real wages is not the same thing as raising labor productivity, although the two are related. Certain forms of institutional or technical change can raise average labor productivity while leaving marginal productivity unchanged or even lower. In neoclassical models of wage determination, marginal labor productivity should be equal to the wage. It is

Approaches to Improving Food Consumption

Income distribution is hard to measure even at a single point in time, and it is doubly hard to track over time. The distribution of food consumption, especially caloric intake, has often served as a proxy for the broader measure of income distribution. Household food consumption surveys are frequently repeated at five- or ten-year intervals with similar protocols and sample frames, so reasonable inferences can be made about distributional changes over time. On a more immediate basis, changes in average caloric intake in a country offer substantial insight into changes in income distribution over time, and such data are available on an annual basis for most countries. Comparisons across countries and over time offer a relatively quick and easy approach to the analysis of comparative patterns of income distribution, or at least one important component of it for which policy makers express concern.

Average caloric intake level for a particular year and country is correctly criticized as a welfare indicator because the distribution of levels around the average is not discernible from the average. But when the average changes significantly over time, substantial implications for welfare change are implied. Middle- and upper-income households have very low income elasticities of demand for calories. If average caloric intake increases or decreases from year to year, most of the changes are due to altered caloric intake in poorer households. When a country increases its average daily per capita intake of calories from well below the recommended average to well above it, the only explanation is that low-income households are better fed. Stagnation or deterioration in this measure means a lower standard of living for the poor.

Table 2 presents the basic data to examine these trends for the twelve countries in the regional sample for the period from 1965 to 1985. The diversity is quite substantial.

also important to stress that the wage under discussion is that prevailing in rural labor markets accessible to any individual desiring to work, not a restricted wage paid, for example, to plantation employees or workers on special government projects.

Table 2. Changes in Caloric Availability in Representative Countries
in Asia and the Near East, 1965-1985

Region Country	Daily Calorie Supply			Supply as Percent Above or Below Average Calorie Requirements		
	1965	1985	% Change	Level ^a	1965	1985
<u>Southeast Asia</u>						
Malaysia	2249	2684	0.9	2232	0.8	20.2
Thailand	2200	2462	0.6	2219	-0.9	11.0
Philippines	1936	2341	1.0	2256	-14.6	3.3
Indonesia	1742	2533	1.7	2164	-17.2	17.1
<u>South Asia</u>						
Pakistan	1747	2159	1.1	2320	-24.7	-7.0
Sri Lanka	2155	2385	0.5	2215	-2.7	7.7
India	2100	2189	0.2	2200	-4.7	-0.6
Bangladesh	1964	1899	-0.2	2300	-14.6	-17.4
<u>Near East</u>						
Tunisia	2296	2836	1.1	2388	-3.9	18.8
Turkey	2636	3167	0.9	2500	5.4	26.7
Egypt	2435	3263	1.5	2510	-3.0	30.0
Morocco	2182	2678	1.0	2423	-9.9	10.5

^a Based on 1983 population structure.

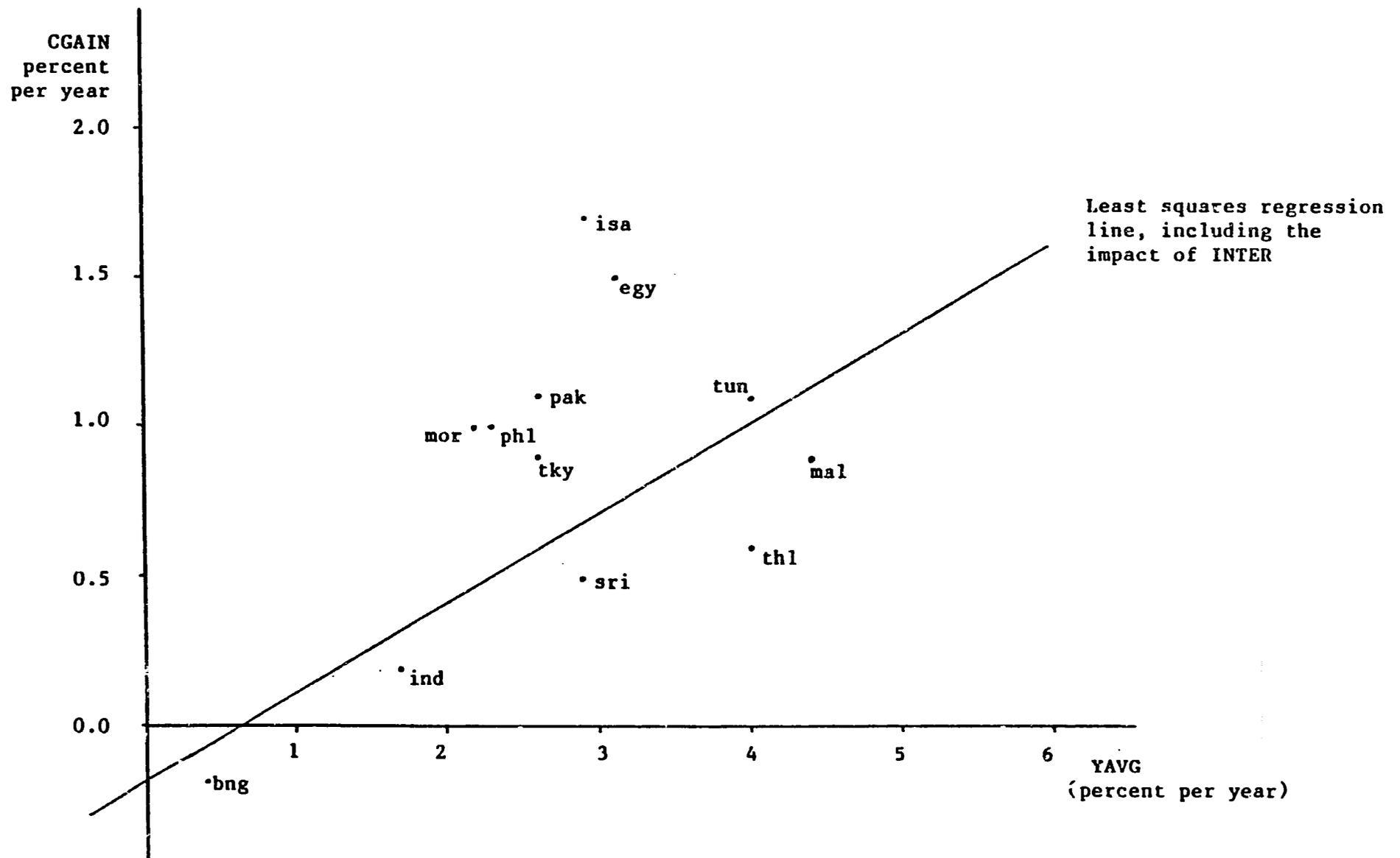
Sources: Data from World Bank, *World Development Report, 1987* (New York: Oxford University Press for the World Bank, 1987).

Daily calorie supplies available, the nearest available proxy for intake, ranged from a low of 1,747 kilocalories (kcal) in Pakistan in 1965 to 3,263 kcal in Egypt in 1985. Relative to recommended levels of intake, based on age structure, activity levels, and climate, Pakistan's intake in 1965 was nearly 25 percent too low, while Egypt's 1985 intake was 30 percent above average recommended levels. Despite substantial disagreement over the true welfare significance and validity of recommended nutritional levels on average, they do provide a useful benchmark that is corrected for the most important differences in population structures and nutritional needs. Any country with average caloric intake significantly below the recommended level almost inevitably has a sizable proportion of the population, usually in rural areas, that would like to consume greater quantities of food if their income levels permitted. This connection to incomes of the poor allows changes in caloric intake over time to be used as a rough proxy for changes in welfare levels of the poor even in the absence of statistics on income directly.

Only Malaysia and Turkey had levels of average caloric intake at or above such recommended levels in 1965; the unweighted average deficit was 7.5 percent. By 1985 only Pakistan, India, and Bangladesh remained below recommended levels, and the unweighted average surplus was 10 percent. On average, the region improved its per capita caloric intake by 17.5 percent, from well below to well above recommended levels--all in two decades. The improvement is especially dramatic in Southeast Asia and the Near East. South Asia's gains were much more modest, and Bangladesh actually slipped backward.

Explanations for the changes in caloric intake across the twelve countries are more complicated than might be expected. Figure 10 plots the average annual percent change in per capita caloric intake (CGAIN) against growth in average per capita incomes. A rough positive relationship is apparent, but the income variable (YAVG) leaves substantial variance unexplained in a simple regression. The size of the initial gap between recommended and actual intake levels (GAP) also fails to explain a significant amount of the variance on its own. The most satisfactory model is shown in Table 3. It combines

Figure 10. The Relationship Between the Increase in Per Capita Calorie Intake (CGAIN) and Average Per Capita Income (YAVG), 1965-1985



Note: See Table 3 for full description of data and regression results.

Table 3. The Relationship between the Increase in Per Capita Calorie Intake and Average Per Capita Income, 1965-1985

	COEFFICIENT	STANDARD ERROR	T-STATISTIC
C	-0.1780075	0.3742098	-0.4756892
YAVG	0.3003325	0.1154684	2.6009930
INTER	0.0171566	0.0086173	1.9909419
R-squared	0.499513	Mean of dependent var	0.858333
Adjusted R-squared	0.388294	S.D. of dependent var	0.524765
S.E. of regression	0.410428	Sum of squared resid	1.516059
Durbin-Watson stat	1.347480	F-statistic	4.491240
Log likelihood	-4.614507		

Residual Plot		obs	RESIDUAL	ACTUAL	FITTED	Countries
:	*	1	-0.17895	0.90000	1.07895	mal
*	:	2	-0.43876	0.60000	1.03876	thl
:	*	3	-0.28927	1.00000	1.28927	phl
:	:	4	0.56440	1.70000	1.13560	isa
:	*	5	0.20051	1.10000	0.89949	pak
:	*	6	-0.33656	0.50000	0.83656	sri
:	*	7	-0.12449	0.20000	0.32449	ind
:	*	8	-0.31747	-0.20000	0.11747	bng
:	*	9	-0.21773	1.10000	1.31773	tun
:	*	10	0.38979	0.90000	0.51021	tky
:	*	11	0.63889	1.50000	0.86111	egy
:	*	12	0.10964	1.00000	0.89036	mor

obs	CGAIN	YAVG	INTER	GAP	YAGR	
1	0.900000	4.400000	-3.760000	-0.800000	4.700000	CGAIN = increase in calorie intake
2	0.600000	4.000000	0.900000	0.900000	1.000000	YAVG = increase in average per capita income
3	1.000000	2.300000	45.260000	14.600000	3.100000	
4	1.700000	2.900000	25.800000	17.200000	1.500000	INTER = GAP*YAGR
5	1.100000	2.600000	17.290000	24.700000	0.700000	GAP = calorie deficit in 1965 (percent)
6	0.500000	2.900000	8.370000	2.700000	3.100000	
7	0.200000	1.700000	-0.470000	4.700000	-0.100000	YAGR = increase in per capita income in agricultural sector
8	-0.200000	0.400000	10.220000	14.600000	0.700000	
9	1.100000	4.000000	17.160000	3.900000	4.400000	
10	0.900000	2.600000	-5.400000	-5.400000	1.000000	
11	1.500000	3.100000	6.300000	3.000000	2.100000	
12	1.000000	2.200000	23.760000	9.900000	2.400000	

income growth in the agricultural sector (YAGR) and the gap into a single multiplicative variable (INTER) and includes it as a second explanatory variable along with the gain in average per capita income for the entire population. This regression explains only half the variance in the growth of per capita caloric intake for the twelve countries between 1965 and 1985, and less than 40 percent of the variance is explained after correcting for degrees of freedom used in the regression.

Other factors than the size of the initial caloric deficit, growth in agricultural incomes, and growth in total incomes are important for explaining why average caloric intake changed. Changes in income distribution and food prices are likely to be the key omitted variables. But that is precisely the point. As Figure 10 shows, the main outliers in the regression analysis are Indonesia and Egypt on the positive side, and Thailand on the negative. India, Bangladesh, and Sri Lanka are also uniformly below the regression line, but not by a great amount. The rapid growth in caloric intake in Indonesia is partly accounted for by the recovery in the economy after 1965, not all of which is captured in per capita income figures. But Indonesia also devoted substantial resources to a successful price-stabilization program, and this effort, plus rapidly rising production of rice, accounts for much of the nutritional improvement. Egypt maintained large subsidies on bread, the basic staple, for most of the period and operated food ration shops throughout the country.²⁹ The positive deviations are understandable.

Thailand's slow gain in caloric intake relative to its growth in per capita income can be accounted for by deteriorating income distribution between the rural and urban areas during the second half of the period. World prices for most agricultural commodities that Thailand exports were very depressed in the mid-1980s. These low prices caused agricultural incomes to grow much less rapidly than the growth in labor productivity in the agricultural sector. In equations where growth in agricultural income enters the regression independently, instead of in combination with the size of the initial gap (which is small for Thailand), Thailand's low growth in caloric intake is no longer an outlier.

29. See Alderman, von Braun, and Siskr (1982) for a discussion of Egypt's food pricing and distribution policies.

The three negative deviations in South Asia, although not substantial, are important because of the regional pattern. South Asia has already been singled out as having low growth in labor productivity, low growth in per capita incomes, and a likely deterioration in rural wages. The data for caloric intake support this characterization. Sri Lanka grew fairly rapidly during the second part of the 1965-1985 period, but with noticeable worsening of what had been a remarkably even income distribution. Average caloric intake increased in Sri Lanka, but not as much as if the previous distribution of income had been maintained. More troubling perhaps, there is evidence of a deterioration in the bottom income decile during the period of most rapid growth.³⁰

India and Bangladesh had very little growth in income or productivity, and their caloric intake was virtually stagnant. Even so, growth in caloric intake was less than would be expected on the basis of the parameters for the rest of the sample. The obvious explanation is a deterioration in rural income distribution as real wages fell. The use in India of higher food prices to induce greater production was a notable production success, but they did little to improve the food intake of the bottom 40 percent of the population thought to suffer caloric deficits.³¹ The worsening distribution of land in Bangladesh, in combination with only limited increases in demand for landless laborers, has exacerbated the situation of the poor in that country. The 1974-75 famine also seems to have permanently reduced the demand for agricultural labor after the massive migrations in search of food and jobs.³²

The most powerful lessons on the relationship between agricultural change and income distribution are simply replays of the dominant themes of the entire paper: the need to stimulate agricultural productivity and to foster the intersectoral links that contribute directly to agricultural development, employment, and rising real wages. When the industrial and service sectors are growing efficiently and have strong market linkages -----

30. See Sahn (1988) for further discussion of the new growth strategy in Sri Lanka after 1978 and its impact on income distribution and caloric intake by income class.

31. See Reutlinger and van Holst Pellekaan (1986).

32. See Ravallion (1987) and the discussion of Bangladesh in Ahmed (1988).

to the rural economy, an agricultural sector that grows fast enough to raise labor productivity, combined with a price-stabilization policy that assures income gains to farmers and access to food for low-income consumers, will raise rural wages and improve income distribution. There are no tricks here; only a coherent food and agricultural policy maintained for several decades can make a sustainable difference to the poor. Managing short-run price policy to stabilize the real incomes of the poor while protecting long-run investments in the rural sector provides an important guarantee of welfare levels of the most vulnerable with the shortest time horizons. But food price policy cannot solve the problem of hunger any more than it can the problem of agricultural productivity. For both problems, agricultural development is needed.

Promoting Employment Growth in Agriculture: Strategies and Prospects

At the appropriate stage for taking stock and looking forward to prospects for the 1990s, the great diversity of the three regions and twelve countries being discussed suddenly induces great caution. Several countries seem poised for rapid structural change and improvements in employment and income distribution. Several seem bogged down in low-growth patterns that offer little hope of significantly higher incomes. Several may well be headed backwards; a deterioration of living standards is likely unless major changes in policy lead to economic restructuring.

Two basic forces are at work to produce these results in the specific context of each country. Rising labor productivity in agriculture is necessary (but not sufficient) for rural wages to increase over time. In a related fashion, increases in per capita food consumption can be stimulated by a number of short-run measures, but higher incomes are the basic guarantee of sustained improvements in the diets of the poor. The chain of causation is labor productivity to wages to income distribution. Policies can reinforce each link in the chain in such a way that improvements in income distribution are amplified or dampened. "Trickle-down growth" benefits the poor only when the links are

amplified by specific governmental design; such benefits can be negligible or even negative without effective government intervention.

What does the experience of this sample of twelve countries since the 1960s tell us about effective government interventions to stimulate growth in employment and improvements in income distribution and the role of agriculture in the process? If raising labor productivity in agriculture is taken as the essential starting point, two complementary paths are open. The first concentrates on raising agricultural output through the package of investments, new technology and incentives, an approach that is well understood, at least in principle, throughout Asia.³³ The second concentrates on raising the labor intensity of the modern industrial and service sectors through more appropriate choices of techniques and products. Evidence that has accumulated since the late 1960s demonstrates that import substitution behind highly protective trade barriers creates perverse incentives for investment with respect to both choices. Low labor absorption and inefficient use of capital in the industrial sector prolong the dualistic nature of the labor market. Many workers with extremely low productivity are left behind in agriculture or, increasingly, in an informal service sector in which real wages are extremely low and uncertain.

Such dualism significantly exacerbates the task of integrating rural and urban labor markets in a manner that draws labor out of agriculture to more productive jobs in the nonagricultural economy. The second path to higher labor productivity in agriculture is more rapid emigration from the sector. In the sample used here, net migration varied from nil in Bangladesh and India, where growth in the agricultural labor force was nearly as large as for the entire labor force, to a pace that caused the agricultural labor force to decline in absolute size, as in Tunisia. No country has been able to move labor out of agriculture fast enough to prevent lower absolute productivity of labor in agriculture

33. See Timmer (1988b) and Ahmad, Falcon, and Timmer (1988).

than that in the rest of the economy.³⁴ When the process is faster rather than slower, however, it contributes to higher labor productivity in agriculture and, via the supply side in rural labor markets, to higher real wages.

Most government policies that influence rural wage formation through an impact on agriculture do so via the demand side of the equation. The main instruments have been reviewed already: investments in rural infrastructure, including irrigation with its second-round impact on multiple cropping; new technologies that raise yields, increase labor requirements, shorten the growing season, and permit a second or third crop; adequate price incentives to stimulate on-farm savings and investments and roundabout expenditure multipliers; and a favorable environment for vertical diversification, which steadily transfers workers from agriculture to industry and the service sector, even if it leaves them in rural areas (and living on the farm). These are the ingredients of agricultural development and structural change. Their successful implementation depends on a healthy relationship between the agricultural sector and the rest of the economy, in terms of both market linkages and policy balance.

34. See Bellerby (1956) for an analysis of the chronic problems of low incomes in agriculture faced by a number of Western countries during their development process.

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