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## **World Trade Issues and Food Security**

by

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# World Trade Issues and Food Security

Terry L. Roe and Munisamy Gopinath\*

## Abstract

While economic growth has lifted more people from poverty than in any prior period, world market shocks of the 1970s and 1980s have caused a massive realignment in country policies, and future growth in population and income are expected to place heavy burdens on world resources. Recently, it has been suggested that a food crisis may be forthcoming as food production per capita has stagnated, risking a reversal of the long-term decline in the real price of food. This paper focuses on food security in this context, and concludes that a rise in the real price of food is likely, but not of a magnitude to create a food crisis. Nevertheless, those already in poverty may be placed at additional risk of nutritional deprivation. Policies for alleviating this possibility are available, but they entail more than just increasing food production.

## 1 Introduction

Economic growth in the second half of the twentieth century has lifted more people out of poverty than in any prior period, although large gaps remain in the wealth distribution among nations. The highest output countries were approximately 36 times richer than the lowest output countries in 1994, and over 1.2 billion people are estimated to live on incomes of a dollar a day or less (World Bank, 1996a). Thus, a large portion of the world's population expend a relatively small share of their total income on food and are relatively unaffected by the long-term trend and shorter-term cycles in world food supplies, while at least one billion people are at serious nutritional risk. Recently, concern has arisen that the world may be entering a period of food shortages. World agricultural production

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per capita has remained flat since 1985, total factor productivity in the leading agricultural exporting countries has trended downward as have public supported investments in agricultural F&D. At the same time, world stocks of grains have fallen to all time lows in 1995/96 and cereal prices appear to be rising. The World Bank estimates that the world's population will increase by 3.7 billion between 1990 and 2030. To meet the needs of that growing population worldwide, food production will have to double, industrial output and energy will have to triple world-wide. Industrial output and energy use will have to increase five fold to cope with population growth in the developing countries.

Can the world's economy accommodate these large changes without increasing the number and worsening the condition of the poor? In answering this question it must be recognized that the world's economy has undergone fundamental changes in the last two decades which, for the most part, have increased average well-being.

The last two decades have been exceptionally turbulent. The world trade shocks to primary commodities of the 1970's, the flood of petro-dollars into world capital markets, and the ensuing debt crises of the 1980's ushered in forces for a massive realignment of economic policy, particularly among countries that could no longer shelter their economies from world markets. Initially, many of these countries cushioned the shock of rising world prices by a myriad of commodity and capital market policies that could not be sustained in the 1980s. These policies tended to tax producers of primary exports, particularly the producers of agricultural commodities traded in world markets, so that the price of staple foods at the consumer level were below their world market **counter-part**.<sup>1</sup> The reaction of the industrial market economies to the second oil shock resulted in a fall in demand for imports and rising real interest rates. The fall in import demand lowered the foreign exchange earning capacity of indebted countries, while rising interest rates increased their debt service costs. Together, these forces precipitated the debt crises which, as a silver lining in an otherwise gray cloud, forced many countries to open their economies to world markets, thereby increasing returns to their **resources**.<sup>2</sup>

Nevertheless, a number of world's economies, particularly in South Asia and Africa, remain relatively closed to world commodity and capital markets. In addition, these relatively inward-oriented economies have poorly developed social and physical infrastructure that tends to make them unattractive to foreign savings, restricts their access to new technologies, and limits their potential for economic growth. It is inward oriented-countries that factor importantly into questions of

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<sup>1</sup> See for example, Krueger et al, (191-92).

<sup>2</sup> The experience of Latin America is interesting in this regard as it **reflects** both extremes, countries that were relatively closed to world markets during the 1970s to a situation of having among the most open economies in the world (Rajapatirana, and Alam, 1993). Several of these countries are becoming major food exporters.

world trade and food security addressed later in this paper. The world food situation must be viewed in this broader context since, as this history suggests, (a) agriculture accounts for a relatively large share of total resources in low-income countries; (b) economic policy and efficiency gains or lack thereof in other sectors can have a greater impact on agriculture than events within agriculture; (c) the majority of the poor and nutritionally at risk households reside in the rural sector, typically far removed from the food policies that urban households have access to; and (d) in advanced economies agriculture tends to be a small share of the total economy but many of these economies are major agricultural exporters, major supporters and suppliers of modern agricultural technologies. All of the above have important implications to food deficit countries.

The paper is organized as follows. We provide an overview of the world food situation in the next section. After considering various factors including the decline in the rate of factor productivity growth in agriculture, we conclude that world food markets may deviate from the real price declines evident in the past. Although a number of uncertainties exist, we do not expect a “food crisis.” A rise in real food prices will place the poor at a greater nutritional risk. This may be further exacerbated by the lack of growth in their export earnings. We focus on policies to ameliorate food insecurity by arguing that investment to augment world food supplies is not sufficient by itself in making a dent in poverty. Instead, we suggest that economy-wide reform is a prerequisite to sectoral reform. The paper concludes with a summary of our findings, and a discussion of two remaining challenges.

## **2 The World Food Situation: An Overview**

The growth in world food demand will be influenced by dietary changes brought about by rising real incomes and by population growth. Culture and other factors may preclude non-vegetable protein consumption at levels observed in Europe and in Western Hemisphere. However, the increase in the per capita consumption of non-vegetable protein caused by growth in real incomes will increase in greater proportion than the demand for cereals.<sup>3</sup> U.N. estimates of population range from 7 billion to 9 billion with a median projection of 8.1 billion by the year 2025. The median projection requires a 1.7% rate of growth in aggregate food supplies to sustain current levels of per capita consumption at current prices and income per capita. This projection coincides with the average annual rate of growth in world food production of 1.7% during the period 1985-95. This is a decrease from the long-run annual average of 2.40% (1961-95). If (a) per capita

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<sup>3</sup> For example, the per capital consumption of pork in China increased by approximate 12% per year between 1983 and 1986 thereby increasing by more than 2% consumption in grain equivalents.

income elasticity of demand for food is 0.18%,<sup>4</sup> and (b) the world growth in real GNP per capita continues at the rate of 1.2% per annum,<sup>5</sup> then the growth in food demand at current prices will exceed 1.9% per year. In the aggregate, a 1.9% growth in demand is likely to place slight upward pressures on real food prices. A variety of factors would accelerate the movement toward higher world food prices: population growth rates faster than 1.7%; a larger income elasticity of demand than 0.18% in countries like China and India; a stagnant or declining world agricultural production per capita.

As discussed below, evidence is accumulating that production may not grow at historical rates, and, in any case, it is the variance in world supplies and stocks that contribute to price “spikes” and consequently, to morbidity and decline in human capital in low income countries, i.e., food insecurity. Moreover, even if the steady state is maintained between food demand and supplies at relatively low agricultural prices, no progress will be made in addressing the needs of the 1.2 billion people living on a dollar a day or less.

## 2.1 Agricultural Production and Trade

According to UN data, growth in world production has averaged about 2.23% per year over the period 1961 to 1993. However, these long-run trends can be misleading. As figure 1 shows, with the exception of 1990, world agricultural production per capita has been relatively constant since 1985 but, this aggregation conceals a number of important differences. The only group of countries showing a continuous increase in production per capita, relative to the base year 1961, are the developing countries. The developing countries account for about 85% of the world’s population and include Asian and Latin American (LA) countries. Starting in 1987, the growth rates of production per capita in developing countries have accelerated. This coincided with the LA countries opening their economies to world markets and consequently improving agriculture’s domestic terms of trade (Rajapatirana and Alam, 1993).

The developed country aggregation includes the industrial market economies of Asia, North America, Australia and New Zealand.. Their agricultural production per capita relative to 1961 peaked in 1985. The least developed country aggregation includes countries in Africa and low income countries in South and East Asia which together account for about 10% of the world’s population. These are countries that typically rely on primary commodity exports, and have not diversified into the export of manufactured goods. Their agricultural production per capita relative to the base year peaked in the late 1960’s - early 1970s. This decline is explained by relatively high fertility rates, a point we discuss later. The

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<sup>4</sup>This estimate is the income share weighted value of the estimated per capita income elasticity of demand in high and low income countries.

<sup>5</sup>This is the average annual rate of growth in world real GNP for the period 1980-92 reported in the World Development Report, 1995.

time series on world and regional cereal, crops and livestock production show very similar trends to the aggregate series. The stagnation in per capita world agricultural production has only recently been accompanied by a decline in carry-over stocks. Stocks of coarse grains, and wheat have shown, with some fluctuation, a downward trend since 1985/86 (World Bank, 1996b).

At the same time, the volume of world grain trade has not changed appreciably since the 1970s with total 1995/96 grain trade estimated at 202 million tons - not far off the average of 207 million tons per year during the 1980s (World Bank, 1996b, 15). However, there are substantial differences in regional per capita trade volumes among high and low income countries. Figures 2 and 3 show the quantity of cereal imports and exports per capita for the same grouping of countries considered in the previous charts. Per capita imports remain the highest among the least developed countries, although they show considerable variation, and appear to follow a flat trend since the early 1980s. Per capita cereal imports of developed and developing countries are nearly identical, exhibiting a slightly negative trend since the early 1980s. The outstanding feature of per capita exports of cereals by the least developed countries is that they are nearly zero and, with the exception of 1993/94, are trending downward. These charts reaffirm that the lowest income countries are dependent on world markets for food, and shocks to world food markets can place them at considerable risk.

The stagnant trends in world agricultural production per capita and declining stocks might suggest that the real price of agricultural commodities should be rising in world markets, but prices have risen only in recent years. Figure 4, taken from Borensztein et al. (1994) charts the permanent and cyclical trends of real food prices over the period 1970-93. The striking feature is the permanent nature of the long-run decline in the real price of food.<sup>6</sup> The distance between the actual and permanent trends shows the cyclical nature of the series. Thus, as a measure of scarcity, this decline suggests that food has become relatively less scarce, i.e., fewer other goods are required to obtain a unit of food in later years than in earlier years. However, if the current increases in food prices indicate a permanent change in trend, then the least developed countries are at a even greater nutritional risk.

## 2.2 Food Prices and Capacity to Import Food

A decline in the real price of food in world markets does not necessarily imply that food consumption per capita in low income countries will increase. Whether food consumption per capita increases depends on a number of factors, such as a country's terms of trade, population growth, and growth in the countries total factor productivity, a key determinant of real income. Suppose the country is a net importer of food. Then, if the price of imported food falls relative to the goods

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<sup>6</sup>The price index of cereals is shown by Grilli and Yank (1988) to have exhibited a downward trend over the period 1900-1987.

a country exports, the foreign exchange earned from exports can be used to obtain a larger volume of food imports, and the country's real total income has increased by an the incremental decline in the cost of living. Per capita food consumption will depend on population growth, all else constant. However, most low income countries are not diversified; they tend to be exporters of primary commodities, including non-food agricultural exports. The prices of some primary commodities have fallen even faster than food, thus decreasing their export earnings and the volume of food they can import without decreasing the imports of other goods, services, and intermediate factors of production which often embody technological **advances**.<sup>7</sup> For many countries, growth in their volume of exports per capita, either from growth in total factor productivity, or from the effects of increased inputs, have not kept pace with the decline in their terms of trade so that foreign exchange earnings per capita have fallen.<sup>8</sup>

Households in low income countries which are net exporters of agricultural products also face food security problems because a decline in the relative price of their agricultural exports will tend to decrease total real income, and agriculture's GDP. Low income countries that specialize in, e.g., cocoa exports, if their rate of total factor productivity growth in agriculture does not keep pace with the major food exporting countries, their costs of production will not keep pace with the decline in the price they receive for agricultural exports. In this case, they will either export less and hence import less, or returns to labor and land will have to fall, or both. Since the majority of a country's poor reside in the rural sector, they tend to bear the brunt of the consequent fall in income. Thus for a number of countries, typically the lowest income profile, the fall in the real price of food has not increased the availability of food on a per capita basis.

Of course, since early 1995, grain prices have risen sharply (Agricultural Outlook, U.S. Department of Agriculture) in response to stock shortages brought about by poor growing conditions in the US for the case of maize and wheat, and the growth in import demand from China, Japan, the Republic of Korea, and Taiwan. India has emerged as the second major exporter of rice, a major factor off-setting the increase in the price of rice over the period from April to October of 1995. The major reports on trends in commodity markets, while admitting to a period of high price volatility, nevertheless forecast, from their 1995/96 highs, a downward to a flattening trend in grain prices starting in late 1996. These forecasts seem roughly consistent with current future market price quotations.

Coefficients of variation as a measure of price volatility are shown in figure 4.

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<sup>7</sup> According to IMF (1995), non-fuel exports of primary commodities experienced large negative terms of trade effects during the early 1990s, and on a regional basis, Sub-Saharan Africa experienced negative terms of trade during the late 1980s and early 1990s

<sup>8</sup>Burundi, Cote d'Ivoire, Kenya, and Tanzania are among the countries in Africa that have experience a decline in, not only per capita export earnings, but in total export earnings (IMF, 1995).



Volatility was high from the mid 1970s to the early 1980s and then rose again starting in about 1985 when world agricultural production per capita became stagnant. In the case of food, Borensztein et al. (1994) find that permanent changes alone account for 73% of the total variance in food prices over the 1970-93 period. These changes are likely to include policy reform, financial liberalization, and agricultural technologies in the US. and Europe. EU farm policies during the late 1980s and early 1990s led to large increases in agricultural exports. For instance, the EU increased its share of world wheat markets from 14% to 20%. Estimates of the effect of these policies on world market prices, all else constant, suggest that full implementation of the Uruguay Bound agreement will lead to a rise in the prices of the previously subsidized commodities. For example, Johnson et al. (1993) forecast an increase in the world price of wheat and coarse grains, and dairy products ranging from about 14% to 25%, relative to 1986 base period prices.

Other uncertainties affecting world supplies of food include the net trade position of the transition economies of the former Soviet Union, and of India and China. Analysis by Mahe and Roe (1995) of the agricultural potential of the Central and Eastern European countries (CEEC) suggests substantial long-run potential for increasing production in these countries. While these countries experienced a deterioration of their agricultural trade balances in the early 1990s the potential for export growth seems large when compared to neighboring EU countries. Yields average close to 6 tons per hectare in the EU and less than 4 tons per hectare in the CEEC while the land under cultivation in the CEEC is nearly 40 percent of the cultivated land area in the EU. CEEC growth in food demand is expected to be modest. Improvements in diets are likely to occur with rising incomes, but caloric consumption is likely to fall, and population growth is expected to be modest. Thus, these countries should increase agricultural exports if economic reform continues. Recent analysis (Wang et al, 1996) of continuing reform and economic growth suggests that China will be a major importer of food. It seems unlikely that India will be a major food exporter despite recent exports of rice. Agriculture accounts for approximately 38% of India's GDP and employs about 70% of Indian labor force. If economic reform continues and incomes grow, it seems more likely that resources will shift out of agriculture and into the production of manufacturers and services, thus limiting the countries potential as a food exporter, in the long-run.

### **2.3 Growth in Factor Productivity**

As noted previously, the rate of growth in world agricultural production has fallen since about 1985, per capita agricultural production appears to have stagnated, and recent evidence suggest a rise in real prices of grains to replenish declining stocks. Are changes in the rate of growth in agriculture's total factor productivity (TFP) behind these recent trends? Our answer to this question is affirmative,

but the rate of growth in other sectors of an **economy also affect the answer.**

In all countries, agriculture must compete with other sectors of an economy for economy-wide resources, such as labor, material inputs and capital. If, in the major food exporting countries, the rate of TFP growth in agriculture is not sufficient to overcome the decline in the price of food relative to the prices of goods and services produced in other sectors of the economy, then economy-wide resources will tend to be allocated to other sectors. In this case, growth in food production and in food exports will tend to decline thus placing upward pressures on the world price of **food.**<sup>9</sup>

From the perspective of food importing countries, growth in TFP is important to lessening the downward pressures on rural wages from growth in labor supply. Since many commodities grown domestically are not traded, e.g, those that are highly perishable, growth in agriculture's TFP tends to pass these efficiency gains to consumers. These gains become a source of growth in other sectors by increasing the amount of disposable income that can be allocated to other goods, services and savings.

Recent evidence from the industrial market economies suggests that the rate of growth in agriculture's factor productivity growth is falling. If these efficiency gains continue to fall, then the permanent nature of the long-term trend in the decline of food prices shown in Figure 4 may be reversed so that the recent rise in grain prices may be the beginning of a longer-term trend. The evidence provided below shows that the rate of total factor productivity growth is falling in some major food exporting countries in recent years, that total factor productivity is strongly dependent on public expenditures on agricultural R&D, and that the decline in these expenditures may be the cause of the decline in productivity growth.

Table1 shows growth in agricultural GDP and TFP for selected countries and years. TFP growth rates for the U.S., France, Germany and the UK range from a high of 6.64 % per year for France to a low of 2% for the case of Germany, and 2.3% for the U.S. While there is considerable annual variation in these estimates, rates on the order of these magnitudes, if sustained into the future and approximately replicated in other food exporting countries, would very likely cause world food prices to continue their long-term downward trend.

However, annual rates of growth in TFP appear to be falling. Consider first the case of the U.S. Figure 5 shows that US agriculture's TFP grew rapidly during the 1949-1968 period. Importantly, notice that the rate of growth in TFP, with the exception of 1979-83, shows a flattened to a slightly negative downward trend

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<sup>9</sup>**The standard neo-classical trade model predicts that if other sectors of the economy are growing at the rate  $\gamma$  per year, then in the presence of declining agricultural prices, agriculture's growth in total factor productivity must exceed  $\gamma$  by the fall in the domestic terms of trade in order to hold the "efficiency terms of trade" constant and hence, with homothetic preferences, the level of exports to imports.**

since the early 1970s. Figure 6 shows the pattern of TFP growth in the U.S., France, Germany and the U.K relative to the average rate of TFP growth in the base years 1974-1978. In the case of all four countries, the over-all trend has been negative. What is causing this decline in the rate of efficiency growth?

Empirical analysis by others, and more recently by Gopinath and Roe (1996), show that the growth in TFP is explained by investments in public R&D, private R&D, rural infrastructure, and by the embodied technological advances in material inputs. The bars depicted in Figure 5 show the relative contributions of each to TFP growth. In the early years, investments in rural infrastructure played a dominant role in TFP growth while public and private R&D played a larger role in later years as new infrastructure investments were reduced and infrastructure maintenance increased. While estimates of this nature are not available for other countries, it seem likely that they too follow a similar pattern depending on their respective levels of development. The cause for the decline in TFP growth appears to be a decline in public R&D expenditures.

Alston and Pardey (1966, p47) state: “ During the 1980s, research expenditures in developed countries grew at only one-quarter the rate experienced during the 1960s; for developing countries the rate of growth slowed to around 2.7 % per annum during the 1980’s, as compared with 7.0 % during the 1960s.” Private sector spending has been proportional to public sector spending on agricultural R&D, so it too has fallen. Alston and Pardey (p.56) report that in the 1990s the public sector spent \$0.79 for every dollar spent by the private sector, in contrast to earlier periods when the public sector spent \$1.06 for every dollar of private R&D. Their data show that in sharp contrast with the situation thirty years ago, developing countries as a group spent more on agricultural research proportionately than did more developed countries.

We are thus left to conclude that the decline in growth of agriculture’s TFP appears to be international in nature, and at least partially caused by a decline in public and private R&D expenditures. Given efficiency gains in the non-agricultural sector, the decline of efficiency gains in agriculture will likely cause a decline in the already flattening level of world agricultural production per capita, and lead to a permanent rise in the longer-run trend of world food prices. The rise in real food prices are unlikely to pose a hardship on the majority of the worlds population, but without other sources of efficiency gains, (which we discuss in the next section), a rise in prices will likely increase the number, and place at greater nutritional risk, the 1/5 of the world’s population that live on less than one dollar per day.

This risk may be further exacerbated by growth in the other non-agricultural sectors of the major food exporting countries which will tend to further limit their export surpluses of agricultural products. Notice in the case of the U.S. that the growth in agriculture’s real GDP has averaged only 0.25% per year over the same period, i.e., agricultural TFP growth does not appear to have appre-

ciably increased growth in GDP. Why? The reason is that the domestic terms of trade facing agriculture have been negative which has caused agriculture to employ fewer resources than it would otherwise have employed had the price of agricultural output not fallen relative to prices in other sectors of the economy. The relatively higher rate of growth in the U.S's non-agricultural sector of 3.12% per year during the 1946-91 period, a rate explained by favorable terms of trade, and growth in non-agricultural TFP of 0.62%, appears to have pulled economy-wide resources from agriculture. During the late 1980s and early 1990s these rates have trended upwards, forcing agriculture to pay higher prices for labor, materials and other economy-wide resources not traded internationally than would otherwise have been the case. While these higher rates of growth translate into higher real incomes for US households, they nevertheless have the tendency to incrementally shift the US's comparative advantage away from agriculture and to dampen its contribution to the world supply of agricultural products. If the efficiency gains in the non-agriculture sector of the major food exporting countries does not spill over to the least developing countries, then the rise in real prices of food are unlikely to be matched by a rise in their real incomes, thus further exacerbating the nutritional status of the poor.

This overview of the world food situation suggests that if current trends continue, world food markets are likely to equilibrate at higher real food prices. While uncertainties abound, such as the net food importing position of China, it is unlikely that this reversal in trend will constitute a food crisis akin to that common to the widely circulated Club of Rome predictions of the early 1970s. Nevertheless, it will likely place at further nutritional risk individuals among the 1/5 of the world's poor that live in poverty, with rising levels of infant mortality, adult morbidity and a corresponding loss in labor productivity. Given the uncertainties, and historically the relatively high variance in real food prices, a more disastrous outcome cannot be ruled out.

In the next section, we focus on policies to reduce the number of individuals in poverty. We make the point that countries' lack of resource endowments are not likely to be the determining constraint to lowering poverty. However, we suggest that policies which focus only on increasing world food supplies are not sufficient either.

### **3 Policies To Ameliorate Food Insecurity**

While investments in agricultural F&D in both high and low income countries appear socially profitable as noted above, these investments alone are unlikely to make a substantial dent in alleviating food insecurity for those in poverty. Poverty occurs because individuals do not have the capacity to access resources even those that help create human capital. Furthermore, those they have access to yield low returns (e.g., unskilled labor). Countries must pursue policies to enhance the capacity of its citizens to access resources particularly those that are

under poverty line.

Experience of the 1980s and early 1990s **suggest that** policy choices are available, and the lack of factor endowments is not the constraint to increased prosperity. Many countries have opened their economies to world markets, and are in the process of addressing institutional failures (e.g., the establishment of property rights, enforcing law and order, and adjudication of voluntarily negotiated contracts, etc.), and investing in the provision of public goods (important of which is human capital, and gender equity in its provision). Many of the least developed countries pursue policies which lead to an inefficient use of their resources, relatively high fertility rates, and poverty which becomes so persistent for groups of the population that it becomes part of culture.

Narrow based policies (such as investments in agricultural F&D, or policies targeted to the poor only) are only likely to be partially successful in “inefficient economies.” In what follows, we first focus on the economic effects of economy-wide policies that have particularly harmful effects on agriculture, and tend to dampen growth in disposable incomes of the poor. Then, we discuss the implications of reversing these policies in the subsection Policy Alternatives.

### **3.1 Economic Effects Of Inward-Oriented Policies**

Studies by Balassa (1986), and Mitra (1986) of country adjustments to economic shocks experienced in the 1970s and early 1980s were later supplemented by numerous country studies, and cross-country syntheses of these **studies**.<sup>10</sup> Countries that pursue various forms of import substitution industrialization (ISI) policies are referred to in this literature as pursuing *inward-oriented* policies because they attempt to prevent world market prices for goods, services, and capital from prevailing in their economies. Consequently, foreign trade typically accounts for a smaller share of their GNP than would be the case if *outward-oriented* policies were pursued. Outward-oriented policies are characterized as those that allow an economy to be open to world goods and capital markets.

A series of studies directed by Kruger, et al (1991) for the World Bank, covering least developed and developing countries over the period 1960-84, focused on the nature of these policies with special emphasis on agriculture. Fourteen of the eighteen countries studied pursued various forms of ISI policies that implicitly taxed (or disprotected) the producers of food staples by an average of about 29%, 17 of the 18 taxed producers of agricultural export crops by an average of about 41 %, and 11 countries taxed producers of import competing crops by about 19 % of the relative price they should have received for their **commodities**.<sup>11</sup> The ironic nature of these policies is that they implicitly tax the poorest in society, the majority of which reside in the rural sector. Results reported in more recent

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<sup>10</sup>See Lal (1990), Corden (1990), Krueger et al (1991) and Little et al. (1993) for a review of the key results of the cross-country synthesis studies.

<sup>11</sup>For these particular estimates, see Schiffand Valdes (1992, Table 5p19).

analysis by the IMF clearly show that strong inward oriented policies are associated with low growth in total factor productivity, low growth in real GDP and GDP per capita, and low savings and levels of fixed investment (Table 2).<sup>12</sup>

Briefly, the effect of the inward-oriented policies is to bias downwards the returns to resources in agriculture relative to those employed in other sectors of the economy. They tend (i) to push agricultural resources out of crops that are traded internationally and into crops that are only traded in the domestic economy, generally those that are perishable and those consumed by the farm household, (ii) to induce a non-farm industrial structure that is concentrated, unable to obtain scale economies, and often employing antiquated technologies, and (iii) to bias downwards a country's total investment in public goods (education, social and physical infrastructure, electrification and other public utilities) and to bias the direction of investment in public goods towards the urban sector of the economy. The instruments employed to implement these policies invariably include taxes on foreign trade, which typically do not generate sufficient public revenues to meet expenditures. The frequent result is fiscal deficits which lead to domestic and foreign public debt, and the monetization of debt which in turn tends to cause other macro economic distortions such as an appreciation of a country's real currency exchange rate, and negative real interest rates. These macro economic distortions further decrease a country's exports and discourage foreign direct investment in the domestic economy.

Effects (ii) and (iii) are particularly deleterious to an economy. In addition to the economic losses caused by monopolistic behavior, high costs of production, and the production of goods of inferior quality and limited variety, the effect of (ii) is to limit employment opportunities outside of agriculture. Lacking employment opportunities outside of agriculture causes labor to become locked into agriculture, the consequence of which is farming on hill sides and other marginal lands, small highly diversified farms, and a sector characterized by a mixture of modern and traditional farming methods. This is a clear situation where economic policy outside of agriculture lowers rural wages, and tendency to limit the scope and lower the returns to what would otherwise be socially profitable interventions in agriculture, including investment in new technologies.

Effect (iii) is also particularly harmful to agriculture since, as the review by Binswanger (1990) shows, agriculture's supply response is particularly sensitive to public investments in roads, electrification, education and extension, and social infrastructure such as well defined and enforceable property rights, contracts and so on.<sup>13</sup>

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<sup>12</sup>To further dispell any notion that countries cannot change their position in the distribution of the world's wealth, see Parente and Prescott (1993).

<sup>13</sup>Using a dynamic general equilibrium growth model for Africa, Yeldan et al (1996), find that growth in real per capita income could be increased by one percent per year over the period 1995-2020 if the 'typical' African country pursued trade liberalization and invested in

Countries pursuing inward oriented policies for an extended period of time typically experience relatively high fertility rates. It is not necessarily the case that population growth is an 'economic bad' as the impression obtained when considering agricultural production per capita, or how growth in food demand per capita. Whether population growth is an "economic bad" depends on the level and nature of human capital embodied in the labor force, i.e., its productivity. However, it is well known that fertility tends to be high in low income households, and to fall as economic opportunity increase, and particularly so for females. This can be seen in Figure 7 for the same group of countries in the Kruger et al studies. Countries in category I pursued the most inward-oriented policies while those in category IV pursued the least inward-oriented policies. Consistent with Table 2, the more outward oriented countries grew faster during the 1960-90 period. Moreover, those countries that were more outward-oriented not only grew faster, they also tended to experience the largest decline in fertility over the 1965-90 period. Thus, policies to induce economic growth also provide incentives to decrease fertility, and in the context of this paper, to lessen pressures on per capita food insecurity.

Thus, while narrow based policies (such as investment in agricultural R&D, programs targeted to the poor) will help to lessen nutritional deprivation, if they are carried out while inward oriented policies of the nature mentioned above remain in place, they are likely to be only partially effective, and even then, they may not be sustainable. The same efforts are likely to be far more effective and sustainable in the context of an economy pursuing policies to maximize returns to its resources, and in the context of a growing economy, to sustain the provision of public goods.

In the next section, we briefly outline the nature of the more outward oriented policies.

## **3.2 Policy Alternatives.**

We focus on four policy areas: trade liberalization and reform, opening capital markets to foreign investments, non-distortionary macroeconomic policies to maintain international competitiveness (including tax reform), and the amelioration of market failures.

### **3.2.1 Trade Liberalization.**

To achieve an efficient allocation of resources to meet final demand means "getting prices right" within the appropriate institutional environment. To get prices right requires world market prices to prevail in the domestic economy so that the true opportunity cost of resources are revealed to decision makers. Granted, the success stories of post WWII Japan, Taiwan, and the Republic of Korea, entail the policies that identified selected infant industries for public support and protection,

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rural public goods.

industries which then eventually became competitive in world markets. However, as Romer (1993, p88) and others have noted, it is unlikely that such a dedicated and disciplined force of bureaucrats to identify the winners and abandon losers can be sustained. Hence, until other politically viable institutions for fostering development can be discovered, the one safe piece of advice to offer countries is that integration with world markets offers large potential gains.

Based on the experience of the Former Soviet Union (FSU) countries, it makes little sense to get prices right if market friendly institutions are not in place so that economic agents, and thus supply, can respond. Nevertheless, this is a question of the speed of reform, not the direction and the ultimate target of reform.

Allowing world market prices to prevail in the domestic economy has strong implications to fiscal policy and revenues. It means obtaining tax revenues from sources other than foreign trade. Prior to reform, many Latin American countries obtained a major source of fiscal revenues from taxes and tariffs on foreign trade (Rajapatirana and Alam, 1993). To get prices right required removing foreign trade as an important source of revenues, and obtaining tax revenues from other sources. Most of these countries have only been partially successful in diversifying their tax bases. However, they found that lower export taxes and tariffs did not lead to the large losses in tax revenues that were initially expected, in part because of the increase in trade volume that 'reform induced.

In addition to the direct efficiency gains from trade liberalization, gains in total factor productivity also occur as trade accounts for a larger share of GDP. While various studies have identified numerous factors associated with economic growth in real GDP, a significant variable common to most of these studies, and a variable that is robust to alternative specifications, is the percentage of a country's GDP that is involved in trade (Levine and Renelt, 1993). Presumably, this relationship reflects embodied technology in the imports of intermediate factors of production, as well as the other more subtle and institutional factors mentioned above.

### **3.2.2 Openness to foreign capital markets.**

Countries that have sustained economic growth are characterized by openness to world capital markets: Open capital markets characterize an environment where both domestic and foreign firms can repatriate profits from local to foreign exchange. Domestic savers can invest in their own country, or on the Hong Kong stock exchange. This form of openness influences the degree to which international markets for final goods, services, information, technology and foreign savings can interact with the domestic economy to yield a growth path along which patterns of production, investment and capacity creation are determined.

Openness to international capital markets also induces product and process innovations embodied in the capital and organization of production that foreign



firms bring into an economy.<sup>14</sup> Importing countries experience efficiency gains in other sectors too as these new technologies and organizations ‘spill over’ to other firms in the economy.. Second, to accumulate capital, it is often the case that the domestic demand for capital exceeds the supply of domestic savings. In the initial periods of reform, households are often reluctant to forego consumption to meet investment demand at interest rates that permit a discounted stream of future returns to equity sufficient to induce a more rapid expansion of production capacity. Then, restrictions on foreign capital inflows lengthens the transition path necessary for the economy to fully respond to new incentives. So, international capital markets are key to shortening the period of transition to a more efficient economy. From a political economy perspective, shortening the period of adjustment to more attractive economic opportunities can lessen the pressures of special interests that resist reform.

### **3.2.3 Non-distortionary macroeconomic policies to maintain international competitiveness.**

Countries that have managed their macroeconomic policy in ways that yield relatively low and stable levels of inflation, and positive real interest rates closely linked to the world market, have also tended to maintain a ‘competitive’ real price of their currency relative to their major trading partners. Together, this environment helps to keep a country’s exports competitive in world markets and relatively attractive to foreign direct investments. The world provides numerous examples where the mismanagement of macroeconomic policy has been extremely deleterious to an economy.<sup>15</sup> Mismanagement is more common in situations when governments pursue inward-oriented policies, when they engage in only partial economic reform, and when they fail to diversify a country’s tax base.

Managing the macroeconomic environment during transition from inward to outward oriented policies are varied, with no clear consensus as to which strategy is necessarily best. Some countries have chosen to pursue exchange-rate-based stabilization programs while others have chosen a money-based stabilization program (Little et al, 1993). However, a recent review of these alternatives (Easterly, 1995) suggests that either of these approaches lead to output expansion if accompanied by balancing fiscal revenues and expenditures, positive real interest rates, open capital markets and trade reform.<sup>16</sup>

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<sup>14</sup>**One body of endogenous growth theory suggests that new technologies embodied within the imported intermediate factors of production spill over to the rest of the economy. These efficiency gains spill over to other sectors as they employ some of the new skills learned in the importing sector, and as some ‘ideas’ embodied in the new technology are reverse engineered for employment elsewhere.**

<sup>15</sup>**Empirical findings of Ramey and Ramey (1994) and Fischer (1993) show a strong negative relationship between macroeconomic volatility and growth.**

<sup>16</sup>**Easterly( 1995) concludes that special interests will resist stabilization unless the gains are very large, which supports the point that shortening the transition path of reform should tend**

Unfortunately, the pursuit of macroeconomic policies that are consistent with an open economy does not mean that a country is isolated from world market shocks. Instead, pursuing sound macroeconomic policies means that the economy is sensitive to shocks to world good and capital markets and thus subject to being ‘buffeted’ by them. In the case of the Republic of Korea for example, the shocks to primary resource markets in 1973/74, to energy in 1979/80, and then to capital markets during the early 1980s, caused relatively large shocks to the economy in terms of raising real interest rates, and declining consumption (Little et al, 1993). However, the affects of these shocks were short lived, and the economy quickly returned to a relatively high rate of growth. The challenge is how to ‘insure’ the human capital of the nutritionally at risk that these shocks may otherwise depreciate through increased morbidity, let alone human misery. We return to these questions below.

### **3.2.4 The amelioration of market failures.**

Countries that have sustained economic growth have been successful in resolving problems in key areas of an economy where the market fails to allocate resources to a socially efficient end. Markets fail in the provision of social and physical infrastructure. Depending on the economy and the level of development, this infrastructure includes roads, rural electrification, education, legal statutes to enforce property rights and privately negotiated contracts, weights and measures, grades and standards. Further, markets also fail in the provision of credit due to the lack of institutional capacity to establish low cost and enforceable property rights to land, and other assets. The linkage between financial institutions and property rights is the provision of collateral to private agents. Collateral permits access to the saving of others through financial intermediaries so that investments can occur and resources reallocated from enterprises that cannot otherwise be sustained in an open market economy.

Other obvious examples of market failure include the provision of information, agricultural related research and extension activities, and education, both formal and informal. Of particular importance is gender equity in the provision of education, and access to labor market opportunities. Thus reform does not necessarily require the lessening of governments’ involvement in the domestic economy. Instead, reform entails redirecting government activities to areas where markets typically fail.

## **4 Concluding Remarks**

### **4.1 Summary**

From our overview of the world food situation we are led to the conclusion that the long-term downward trend in the real price of food is likely to be reversed.

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to lessen political pressures to reform.

The reversal is expected due to stagnating growth in per capita world agricultural production at historically declining real prices of food. Upward price pressures emanating from food demand include population and income growth including the upgrading of diets which increases cereal equivalent consumption. Upward price pressures from supply include declines in the rate of total factor productivity growth in agriculture in the major food exporting countries, and the growth in returns to resources in other sectors of these economies relative to agriculture. These effects tend to pull economy wide resources from their food exporting sectors with a consequent downward pressure on growth in their export of food.

The cause for the decline in agriculture's TFP appears to be a decline in the rate of growth in public support of agricultural R&D. As governments in advanced countries have decreased substantially the rate of growth in their investments in agricultural R&D and commitments to international agricultural research institutes, so has the private sector. Governments in some developing countries also appear to be decreasing the rate of growth in their commitment of resources to the development and adaptation of new agricultural techniques and practices. Other supply side factors placing upward pressures on world food prices include compliance with the Uruguay Pledge by the U.S. and the E.U. Sources of potential new growth in food supplies include the countries of East and Central Europe and Latin America.

Uncertainties abound. They include these new potential sources of growth in food supplies, and the net agricultural trade position of large countries such as China and India. Another uncertainty is whether the export earnings of the least developed countries that appear dependent on food imports will be able to sustain per capita imports in the presence of a long-term upward trend in world food prices and, for some, a decline in the relative price of their exports (figures 2 and 3).

Nevertheless, it is not likely that a reversal in the downward permanent trend of world food prices will be termed a "world food crisis." Since growth in the world economy continues to lift people from poverty, the additional individuals that will be added to those placed at "nutritional risk" will probably be small by most world-wide standards, at least any standard akin to that common to the widely circulated Club of Rome predictions of the early 1970s.

Herein lies a trap, however, because the result may cause an unnecessarily ambivalent concern with the plight of 1/5-th the world's poor that live in poverty, which tends to be most pervasive South Asia and Africa. The poor in these countries will likely be placed at increased nutritional risk with resulting increases in infant mortality, adult morbidity and corresponding declines in labor productivity among the poor.

The remedy to steadily decreasing the proportion of the world's poor that live in poverty and risk further nutritional deprivation from the equilibration of world food supply and demand at higher real prices, lies not only in increasing

agricultural production per capita, but in increasing their real incomes. we suggest that resource endowments in countries dominated by poverty are not in fact the key constraint to alleviating poverty. Instead, drawing upon the experience of countries having sustained periods of relatively high economic growth, and from the growth experiences of countries that have reformed their economies, we suggest a large dent is likely to be made in poverty by pursuing economy wide policy reforms. Efforts to increase world food production per capita are likely to be far more effective at reducing nutritional deprivation on a per capita basis if carried out in an economy that is more outward-oriented. This is not a “new view.” The equivalent has been advanced by others years ago.<sup>17</sup>

The nature of these reforms include trade liberalization, openness of foreign capital markets, macro economic policies to maintain international competitiveness (including tax reform), and the amelioration of market failures. Another benefit from policies that induce economic growth is the tendency for fertility to decline, thereby alleviating pressures on the per capita demand for food. These reforms are needed to reverse the effects of inward oriented policies which, in general, have tended to decrease the returns to resources in agriculture (where the majority of the poor reside) and more specifically, to push resources out of crops that are traded internationally, to induce an industrial structure that is concentrated and unable to obtain scale economies, and to under invest in rural public goods thus further limiting agriculture’s contribution to the economy. Inward oriented policies also precipitate a number of macroeconomic imbalances that tend to further increase agriculture’s terms of trade with the rest of the economy and to decrease a countries competitiveness in world markets.

## 4.2 Two Major Challenges

Numerous challenges remain. We briefly mention two, the political challenge and the challenge to carry the nutritionally at risk through short-run periods of food scarcity.

In the 1980s many countries adopted outward oriented policies following an economic collapse induced by a fast rise in the price of energy, a rise in real interest rates, and a decline in import demand by the industrial market economies. Thus, reform is difficult because the future is unclear and the political pressures from individuals, and coalitions of special interest seeking to obtain from the state that which they cannot obtain from the market alone become entrenched. Under most circumstances, it is individually rational for groups within the polity to behave in this manner, even though such behavior in the aggregate may give rise to inward oriented policies with the deleterious consequences discussed above.

Countries that have achieved successful transitions from inward to outward oriented policies have accomplished the following. They have (i) reoriented pol-

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<sup>17</sup>See for example, Srinivasan (1982).

icy to instruments that provide the least scope for rent **seeking**,<sup>18</sup> (ii) induced institutional changes that increase incentives for those disadvantaged by current policy to lobby and engage in political activity in their own self interests relative to those that will suffer short-term losses from reform, and (iii) use political leadership and policies to reorient political pressure away from narrow based self interest and toward the economic performance of the broader economy (such as retirement programs with payments based on performance of the economy, and more open factor markets to diversify sources of income). Whether the persistence of poverty in poor countries can be alleviated will depend heavily on the willingness of the polity to differentiate between the efficiency of markets, and the efficiency of the public's role in creating institutions to help identify and manage market failures.

The second challenge is to carry the nutritionally at risk through short-run periods of food scarcity. While broad based reforms of the nature discussed are associated with successful economic growth experiences, impoverished households will still be at risk to adverse food market shocks. For impoverished households spending upwards of 70 % of their disposable income on food, the transmittal of world market shocks into the economy (such as the relatively large coefficients of variation shown in Figure 4) is likely to place them at serious nutritional risk. As is well known, even moderate food price shocks increase infant mortality, and morbidity more generally. Humane considerations aside, even moderate food shocks "speed up the depreciation of human capital" of individuals in poverty, i.e., lower their long-run productivity. Given the high proportion of the population that is poor in countries in South East Asia and Africa, and countries such as Haiti, resources to sustain them through food market shocks may not be available from domestic resources alone.

Of the various types of programs to target food assistance to the poor that have been tried, for the most part, they have only met with limited success. Moreover, if cost effective, they tend not to reach rural areas where most of the poor reside.<sup>19</sup> For the countries studied, Lal (1990) finds that direct transfers and social expenditures to alleviate poverty did not make an appreciable dent in poverty; in many cases these programs institutionalize poverty, and they tended not to be sustainable in the longer run. Attempting to become food self-sufficient typically results in a country foregoing its comparative economic advantage in other sectors, with a consequent fall in national income.

Still while only marginally effective, the successful variants of the targeted programs should be considered as an intermediate measure. For the transition period to a more efficient economy, no feasible and obvious solution to alleviate food insecurity for all seems available. If food price shocks are viewed as leading to

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<sup>18</sup>Roe and Valdivia (1992) discuss the success of the Mexican government in pursuing this strategy.

<sup>19</sup>See Srinivasan (1983) for a discussion of these issues.

a potential long-term depreciation of human capital, i.e., the loss of productivity in the future, what institutional structure might provide incentives to insure or loan resources to the impoverished to carry them through the shock? Is there some way in which the income stream from the human capital that did not depreciate as a consequence of a “food loan” could be taxed to pay off the loan after the adversity of the shock subsided? Since the productivity of human capital tends to have positive spill over effects on the productivity of other resources (e.g., the positive externalities of learning by doing), individuals receiving the “food loan” need not be the sole payers of debt service. It is unlikely that commodity future markets can offer sufficient insurance to allow anticipation of future price shocks and consequently serve to smooth spot market prices for food. Thus, during a period of transition to a more efficient economy, a solution as to how food security might be granted to those at risk in the presence of food market shocks remains a challenge.

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Table 1. GDP and Total Factor Productivity (TFP) Growth Rates For Selected Countries and Years

Country <sup>a/</sup>	Agriculture		Non-Agriculture	
	Growth in GDP (Mean, %/Yr)	Growth in TFP (Mean, %/Yr)	Growth in GDP (Mean, %/Yr)	Growth in TFP (Mean, %/Yr)
U.S. <sup>b/</sup>	0.25	2.30	3.12	0.62
France <sup>c/</sup>	5.24	6.04	3.90	2.90
Germany <sup>c/</sup>	1.76	2.00	2.90	2.40
U.K. <sup>c/</sup>	7.02	6.40	2.40	1.70
Indonesia <sup>d/</sup>	4.01	0.18	6.53	1.85
India <sup>e/</sup>	2.25	1.24	3.99	1.13
Chile <sup>f/</sup>	2.39	1.44	2.97	1.48
Kenya <sup>f/</sup>	3.33	2.24	4.39	0.19

<sup>a/</sup>The time periods vary. For the US, the period is 1944-91, for other countries the period ranges from 1974-93. Chile ranges from 1961-82.

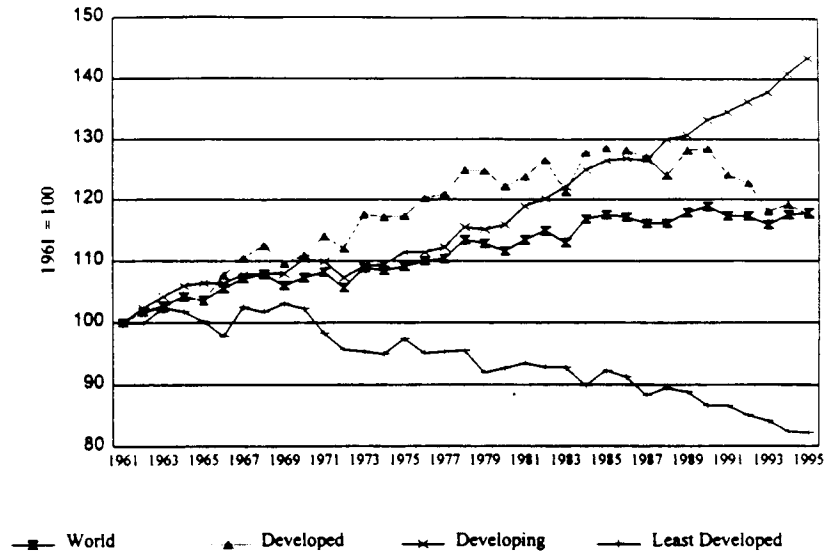
<sup>b/</sup>Gopinath and Roe (1996); <sup>c/</sup>Gopinath, Roe and Shane (1996); <sup>e/</sup>Govindan, Gopinath and Roe (1996); <sup>f/</sup>Gopinath, Roe and Yeldan (1995).

**Table 2. Developing Country Trade Orientation**

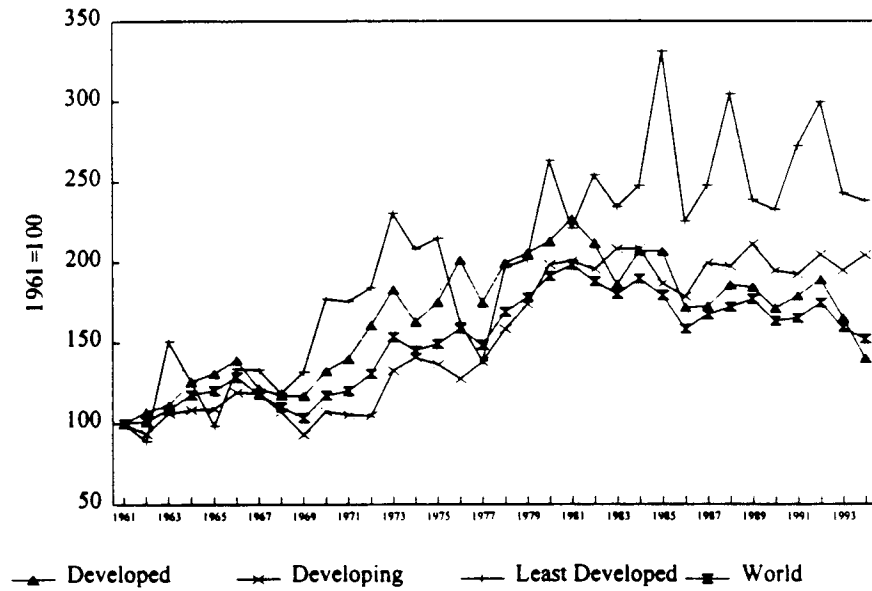
<b>All Developing Countries</b>	1974-85	1986-92
Real GDP growth	4.1	3.8
Real per capital GDP growth	1.7	1.5
Total savings (% of GDP)	18.1	18.1
Total fixed investment (% of GDP)	20.6	18.9
Capital-output ratio	1.5	2.3
Total factor productivity	0.8	1.4
<b>Strongly outward-oriented</b>		
Real GDP growth	8.0	7.5
Real per capital GDP growth	6.1	5.9
Total savings (% of GDP)	30.3	34.0
Total <b>fixed</b> investment (% of GDP)	30.1	28.8
Capital-output ratio	1.3	1.4
Total factor productivity	2.6	3.8
<b>Moderately outward-oriented</b>		
Real GDP growth	4.3	4.8
Real per capital GDP growth	2.2	2.5
Total savings (% of GDP)	18.6	17.9
Total fixed investment (% of GDP)	22.4	18.3
Capital-output ratio	1.2	2.1
Total factor productivity	0.9	2.4
<b>Moderately inward-oriented</b>		
Real GDP growth	4.4	2.4
Real per capital GDP growth	1.8	-0.1
Total savings (% of GDP)	18.1	15.8
Total <b>fixed</b> investment (% of GDP)	20.5	17.9
Capital-output ratio	1.3	2.4
Total factor productivity	1.3	0.3
<b>Strongly inward-oriented</b>		
Real GDP growth	2.3	2.5
Real per capital GDP growth	-0.3	-0.1
Total savings (% of GDP)	13.7	10.9
Total fixed investment (% of GDP)	16.3	14.1
Capital-output ratio	2.0	2.8
Total factor productivity	-0.4	0.3

Source: IMP, World Economic Outlook, May 1993, p.76

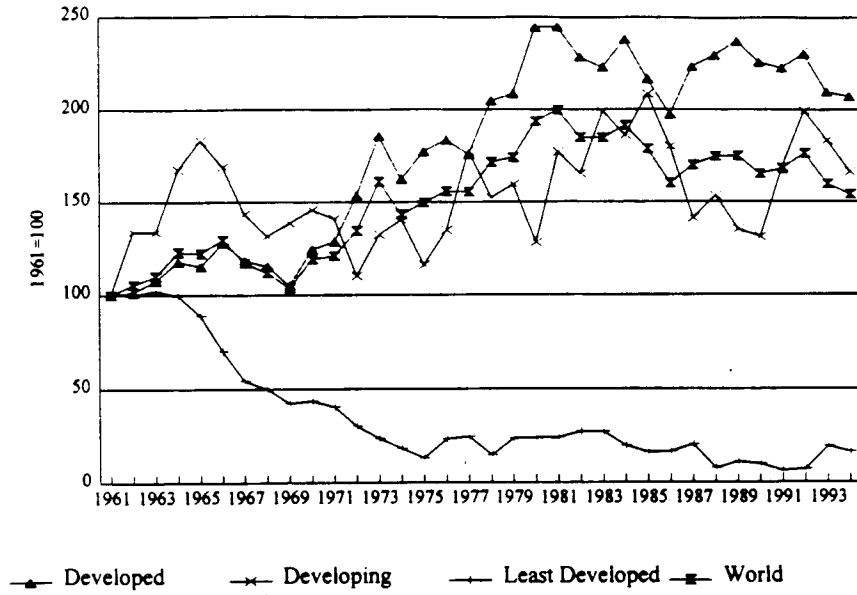
**Figure 1. Agricultural Production Per Capita, 1961 to 1995**



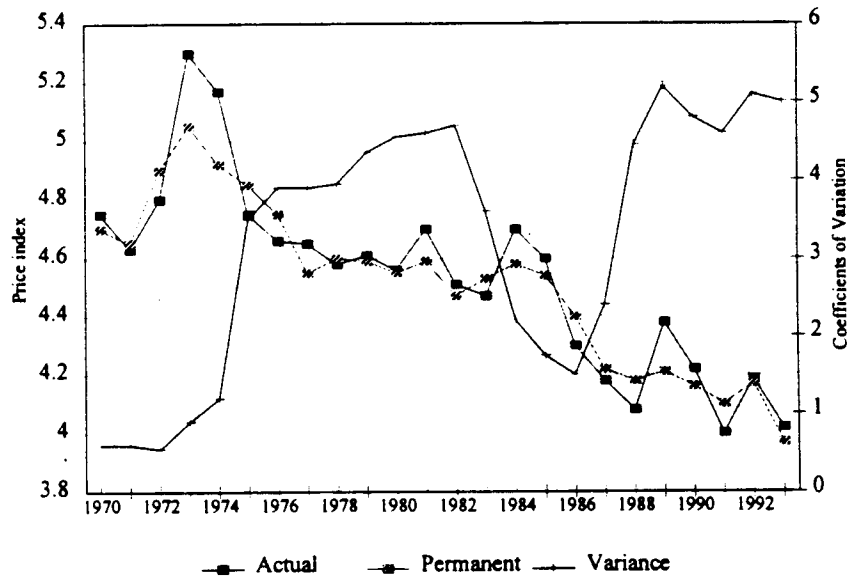
**Figure 2. Cereal Imports, Quantity Per Capita**



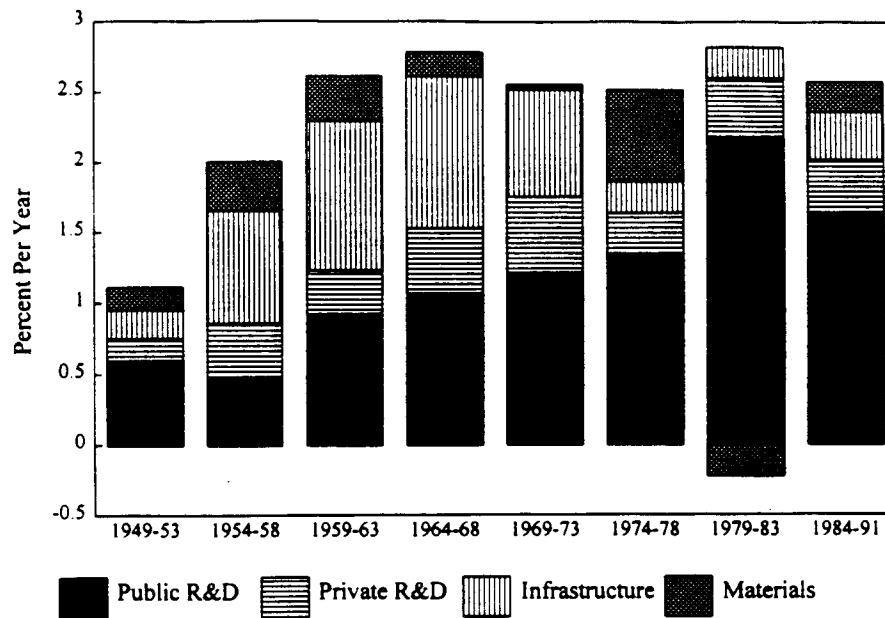
**Figure 3. Cereal Exports, Quantity Per Capita**



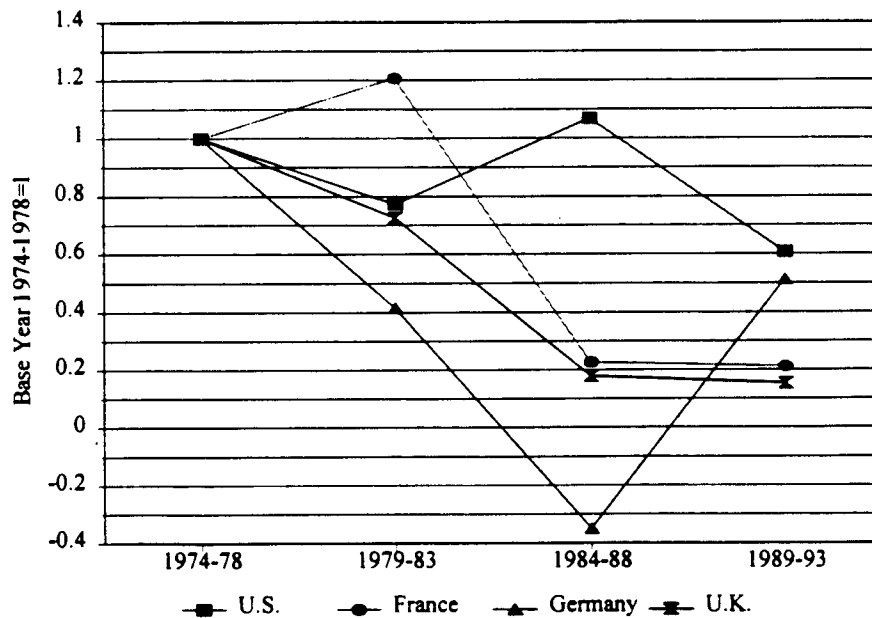
**Figure 4. Real Food Prices: Trends, Cycles & Variation**



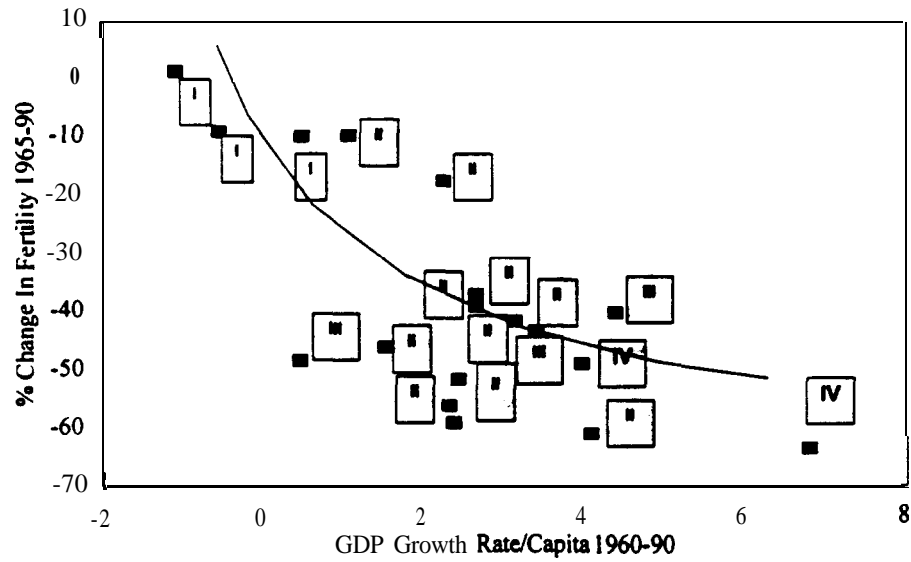
**Figure 5. Sources of Growth In U.S. Agricultural Total Factor Productivity**



**Figure 6. Changes In Total Factor Productivity, Agriculture, 1974-1993**



**Figure 7. Fertility & Growth Rates & Degree Of Inward-Orientation**



I: Most Inward IV: Least Inward. Source: Derived from Krueger et al studies Summers & Heston data, and fertility estimates reported by the UN