7 Linkages from Agricultural Growth in Kenya

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Kenya is an exciting case for those who suspect that agriculture has powerful linkages with the rest of the economy. Over the period 1965–87 Kenya's agricultural production consistently surpassed the average for Sub-Saharan Africa. The same was true of its manufacturing and services (see World Bank 1989, table 7.1). One possible explanation for this performance is that agricultural growth stimulated growth in the other sectors of the economy. Such a hypothesis is a priori plausible because Kenya's government policy, in contrast to that of other African governments, was not heavily biased against agriculture. Thus, it makes more sense to attribute the country's good agricultural performance to pro-agricultural policy than to attribute its good industrial performance to pro-industrial policy. It appears that Kenya's policy had an exogenous influence that tended to favor agriculture, and this partiality generated indirect benefits for the rest of the economy. Elsewhere in Africa, policy heavily favored industry and services, but any indirect benefits from these sectors to agriculture were evidently negligible. The situation in Kenya suggests that a pro-agriculture policy not only promotes agricultural growth but also helps industry and services achieve faster growth than they would if those sectors were favored.

Kenya's economy has always been heavily dependent on agriculture. As of 1987, almost 30 percent of GDP and more than 60 percent of exports were agricultural. For the past two decades, no long-term trends have been discernible owing to a series of large, short-term shocks—both positive and negative, agricultural and nonagricultural—originating at times in exogenous price changes and at others in exogenous quantity changes. In some instances these primary shocks triggered inappropriate policy reactions that had their own repercussions. The economy barely emerged from the policy aftermath of one shock before it was hit by a new one. Much of the macroeconomic regulatory environment, that is, the "control regime," is best understood as an accretion of crisis responses that account for the disjointed nature of that performance.

The key changes in agricultural policy took place nearly a decade before

Kenya gained independence in 1963. Under the Swynnerton plan of 1954, peasants were allowed to grow cash crops, the White Highlands were opened, and supporting services were organized. These changes led to a rapid expansion of peasant production, which marked the transition to a more commercially oriented agriculture. After independence, agricultural marketing monopolies were extended and some land redistributed. Industrial development was supported through an import substitution policy. The 1960s were a period of successful economic development, with an economic growth rate of over 6 percent per year, fiscal balance, low inflation, and a stable exchange rate.

In the early 1970s the balance of payments deteriorated because of falling terms of trade and a Keynesian experiment with expansionary budgets. In response, the government adopted a contractionary policy and introduced price and import controls, which it by and large retained in the years to follow. In 1973 oil prices quadrupled and export volumes fell. In 1974 agriculture was hit by a severe drought. This conjunction of negative shocks gave rise to a serious balance of payments crisis. The required adjustment in living standards was deferred during the next two years by a combination of short-term foreign borrowing and sharply reduced investment. This reaction was unsustainable and would have had to be reversed in the late 1970s, except for another exogenous event. Just as Kenya was starting its adjustment, a severe frost occurred in Brazil, and the real price of coffee more than doubled between 1975 and 1976. Kenya's trade balance and investment then recovered dramatically and its ideas for restructuring the economy were abandoned.

Against all domestic and world professional advice, Kenya's president decided that the increase in coffee prices should be passed on to the peasants. Initially, the increased revenue accrued to the private sector, but after a time, government revenues increased, and eventually public expenditure did so as well. This trend continued after the boom itself had ended. By that time the government had started to lose control over its expenditures, and this weakening set the stage for what was to follow. Many expenditure plans that were conceived during the boom had their major impact after it had passed. Most of the new investments in production went into import-substituting industries, such as nonfood manufacturing.

Between 1978 and 1980, coffee prices fell to more normal levels, but import prices rose sharply in the wake of the second oil shock. As a result, the terms of trade fell drastically. Moreover, the government had now built up a foreign debt that had to be serviced. The budget and balance of payments deficits soared, and inflation accelerated. Once again, the government chose to rely on foreign borrowing rather than real adjustments.

In spite of the large deficits on the current account in 1979 and 1980, the government refused to devalue. Instead, it attempted an uncoordinated trade liberalization in 1980, which merely exacerbated the deficit. In reaction, imports were reduced drastically. The deteriorating economic position perhaps

contributed to the coup attempt of August 1982. Although the coup failed, it led to capital flight, which prompted a number of policy changes. The government reintroduced an export compensation scheme, curtailed its investment in projects and enterprises, increased support to private industry and to the development of agriculture, and committed itself to bringing the macroeconomy into balance.

As part of the new strategy, the government moved from a fixed exchange rate against the U.S. dollar to a more flexible rate with the shilling pegged to the special drawing rights (SDR). In practice the policy has been one of crawling-peg depreciation. Interest rates were raised to a positive level in real terms in 1983, and subsequent monetary policy was aimed at keeping real interest rates positive.

In 1984 Kenya was hit by one of the worst droughts on record. It led to a decline in the production of products like maize, wheat, tea, and livestock, and a fall in total agricultural production of 3.9 percent. Later in the year, the economy was helped by a mini-boom in tea, which approximately offset the drought. However, the aftereffects of the drought persisted into 1985 in the form of a substantial drop in coffee output that year. There was also a decline in livestock production owing to a decline in the herds the previous year.

A new drought in Brazil in 1985 caused coffee prices to rise by about 40 percent between 1985 and 1986. This, together with falling oil prices, enabled Kenya to improve its balance of payments, and allowed real incomes to rise. The boom, however, was short-lived and its consequences were not as dramatic as those of the earlier boom. During the second coffee boom the government embarked on new fiscal initiatives and there was now a built-in stabilizer in the form of a progressive coffee tax.

In 1986 Kenya had a record maize harvest, but in 1987 the yield declined because of poor rainfall in some parts of the country. At the same time, real coffee and tea prices fell to very low levels. With the drop in coffee prices, the foreign exchange situation began to deteriorate. As in previous negative external shocks, the government's initial reaction was to become more restrictive in the administration of the import schedules. After 1988, there was some liberalization again, since the rains were good and several crops had a record year.

In the aftermath of these various shocks, Kenya made some important changes to macroeconomic policy during the 1980s. The fixed exchange rate regime gave way to a flexible system with frequent adjustments. Low interest rates were replaced by rates above the rate of inflation. The budget deficit was reduced. In agriculture, producer prices of a range of crops were raised and fertilizer supply improved. Marketing arrangements were also changed. The new system is somewhat more efficient, since there are fewer delays in payment, although some parastatals are still highly inefficient. The industrial program concentrated on import liberalization and tariff rationalization, price decontrol, improved export and investment incentives, a restructuring of financial

institutions and the development of financial and capital markets (Kenya, 1986a). Despite these efforts and a substantial real devaluation exports continued to perform poorly. The bright spot was that Kenya's tourism expanded rapidly after 1983, and in 1987 tourism overtook coffee as the main foreign exchange earner.

The fortunes of the agricultural sector seem to have played an important part in the macroeconomy of Kenya. The rest of the chapter probes deeper into this issue and analyzes the linkages between agriculture and the rest of the economy from different angles. The analysis focuses on the period from 1972 onward, which is when all the shocks described occurred. It is also the period for which a consistent data set is available. For the econometric analysis, however, the sample goes back to 1964, to obtain a longer time series.

Agricultural Performance and Its Causes

Ecological conditions vary greatly throughout Kenya, as does agricultural potential. These differences are reflected in the settlement pattern. Since most of the country can only be used for stock-raising of varying intensity, population density on the average is less than 50 persons per square kilometer. However, the areas inhabited by smallholders tend to be densely populated.

With the arrival of the British, agriculture developed a dual character (see Bevan, et al. 1989). On the one hand, the agriculture of white settlers concentrated on producing for export, and this sector received substantial support. In the 1930s, for example, boards were established to control production and to protect the interests of settler producers. Local farmers, on the other hand, received little support. The only African farmers who were able to sell some of their produce for cash were those within reach of the newly developed commercial links and centers. Since the only way for those in peripheral districts to get cash was to move to these centers, labor migration became extensive.

The situation improved in 1954, however, when the Swynnerton plan proposed the development of extension services in the African areas, access to credit, permission to grow cash crops, and land consolidation and registration to encourage African agricultural production. With restrictions on coffee growing lifted and with the establishment of the Kenya Tea Development Authority, coffee production among Africans and smallholder tea production expanded rapidly. Cash crop production was also facilitated by the research and experimentation already undertaken by the settlers. As a result, the rate of growth of marketed output from smallholders increased from 7.3 percent a year in 1954–63 to 12.6 percent in 1964–70. By 1967, half of the marketed output came from smallholdings. This percentage has since remained fairly constant.

After independence, the European farms in the mixed farm areas gradually changed hands. Some 40 percent of this land was devoted to settlement schemes, while the remaining 60 percent was sold intact to individuals or

companies. To a large extent, ranches and plantations remained in foreign hands, and most of the highlands are still dominated by large-scale agriculture. Thus, by and large, Kenyan agriculture retained its dual structure after independence.

Agricultural Growth since 1972

Between 1965 and 1972 agricultural growth accelerated at a pace of 5.2 percent a year because of the increase in smallholder cash crop production. After 1972, growth fluctuated, but on the average remained at about 3.7 percent per year up to 1989. Agriculture therefore grew at about the same rate as the population over the entire period, but more slowly than most other sectors. GDP grew by 4.6 percent per year. Manufacturing was the most rapidly growing sector, with an average rate of 7.1 percent, while private and public services expanded at 5.5 and 5.6 percent, respectively. The construction sector grew by only 1 percent per year on average. In other words, since independence the emphasis has shifted somewhat from agriculture to manufacturing and services, while construction has grown surprisingly slowly.

Of course, fluctuations in agricultural growth have a great deal to do with the vagaries of the weather. Three severe droughts occurred in this period, in 1974, 1979, and 1984, the last of which was particularly harsh. There have also been substantial positive deviations from the trend growth of output. After the price increase of the coffee boom, output increased substantially, and there was an incentive to apply more fertilizer and increase labor input.

Consider now the growth of the constituent parts of agriculture. Because of data limitations, once we disaggregate we are confined to components of gross marketed production, but we may note that the total increase of this is the same as that of agricultural value added, including subsistence (see table 7.1). Although it is at times difficult to separate smallholder from large-scale agricultural production, the share of output marketed by smallholders appears to have been about 50 percent throughout the period, although it was slightly lower in the last few years. Once subsistence production is included, the share of the large farm sector shrinks to about 40 percent.

In aggregate, marketed production has increased at an average rate of about 3.7 percent per year since 1972. The production of cereals, mainly maize, was gravely affected by the droughts, but otherwise did fairly well during the 1980s. The production of permanent crops, such as the major foreign exchange earners coffee and tea, has grown throughout the period, with a temporary peak during the coffee boom. Livestock production has not shown any marked trend, until the sharp upswing in the past few years. And temporary industrial crops show a mixed pattern: pineapple and tobacco production has grown, sugar has stagnated, the once-important crop pyrethrum declined substantially during the 1980s, and cotton production has collapsed, in part because of long delays in payments.

TABLE 7.1 Indices of gross marketed production, 1972–1989

Year	Cereals	Annual Crops	Perennial Crops	Livestock	Total	Share of Smallholders in Total (percent)
1972	100.0	100.0	100.0	100.0	100.0	52.5
1973	108.2	107.9	111.5	94.2	103.6	51.3
1974	103.5	123.5	111.9	85.7	102.6	50.6
1975	119.9	132.7	106.0	86.3	104.5	55.6
1976	145.0	125.1	121.2	81.4	111.1	50.7
1977	115.1	129.5	150.7	94.3	122.5	50.3
1978	89.3	157.3	138.9	107.7	119.8	55.8
1979	99.9	191.8	131.9	92.3	114.3	52.7
1980	99.6	240.4	146.7	85.1	126.0	52.2
1981	133.7	243.7	146.9	89.1	131.2	53.8
1982	154.9	224.6	148.0	85.2	131.7	51.7
1983	161.4	183.8	170.2	92.3	142.4	51.2
1984	121.4	167.0	191.4	88.1	144.8	51.0
1985	144.9	185.6	188.1	101.3	151.8	54.2
1986	161.9	189.0	202.2	110.7	163.4	45.1
1987	143.2	200.2	201.4	118.2	164.5	47.2
1988	134.0	204.2	237.1	141.8	177.3	47.1
1989	150.3	224.9	219.0	143.7	184.5	49.3

SOURCE: Kenya, *Statistical Abstract*, various years.

The relative shift out of cereals production is not due to changes in relative prices. For the period 1972–89 as a whole, the price indices (set to 100 in 1972) were, by 1989, 596 for cereals, 591 for temporary industrial crops, and 503 for permanent crops. The prices of major cash crops such as coffee, pyrethrum, and cotton have thus increased at a slower rate than the price of maize, and one would expect this relative price shift within agriculture to benefit the poorer farmers or those in the less fertile regions, who are less able to grow nonfood crops.

Factor Accumulation

Because Kenya had large expanses of unused agricultural land at independence, the impressive performance of agriculture since then has been based largely on an increase in acreage. The large farm area has increased somewhat over the period, but it is primarily smallholders who have plowed new land. There has also been considerable migration into semiarid areas.

Between 1972 and 1984 agriculture on average grew by 3.1 percent per year, in large part because of land expansion, which accounted for an increase of 2.4 percent (Cleaver and Westlake 1987). Now there is scarcely any new land

available, and future increases in production must come mainly from increases in the output of existing land.

Labor's contribution to agriculture has followed a pattern similar to that for land. Wage employment in large-scale agriculture has expanded only slowly, while smallholder labor almost doubled between 1972 and 1989. However, not all of these workers are employed in agriculture. Some smallholder households sell their labor in the labor market. In particular, males in the smallholder labor force migrate to other areas to look for jobs. Although nonresident household members constitute perhaps only 5–6 percent of the extended household, they are considerably more important economically than this indicates. Participation in the labor market tends to be highest for the categories with the least land. In spite of labor sales, households operate their holdings with vastly different endowment ratios. These differences may be offset in part by changes in the cropping pattern, but such changes have only a limited effect on the endowment ratios.

The land market, it should be added, is very restricted. Smallholder households sell land only when there is a pressing need for cash. Hardly anybody sells land to adjust the endowment ratio or to finance investments in agriculture, for example, and the resulting suboptimal allocation of resources has no doubt had an adverse effect on efficiency. Another important endowment is human capital. The educational levels of the younger cohorts are dramatically higher than those of the older ones. To the extent that better education means higher productivity, there should be scope for increased production inside and outside agriculture.

Agricultural Policies

Whatever its other biases, policymaking in Kenya has exhibited less urban bias than is evident in some other countries in the region. The critical variables are said to be land policy and the tolerance for, or encouragement of, private investment in agriculture by the members of the political elite; the elite's investment in agriculture has contributed greatly to the evolution of a policy environment favoring agricultural producers (Lofchie 1989). In Tanzania, in contrast, the elite has cut itself off from land ownership, and the welfare of agricultural producers has come to be a more peripheral goal (in spite of the officially proclaimed ideology). Kenya's government has been more cautious than many others in Sub-Saharan Africa about intervening directly in agricultural production. It has seen its role mainly as a facilitating one (Johnston 1989, 231).

Agricultural policies have dealt with new technologies, marketing, pricing, and infrastructure. The major breakthrough in cereals technology in Kenya was the development of high-yielding varieties (HYV) of maize. HYV maize has been adopted extensively in Kenya, but many farmers have been unable to extract its full potential because they have neglected to apply the full package of

fertilizers that is needed (Ongaro 1988). They have not done so because they have not received the necessary information from extension workers or have no access to credit. The latter has proved to be a major constraint on the application of the appropriate husbandry practices, particularly among smaller farmers. Nevertheless, the new maize varieties have undoubtedly been an important factor behind the growth in cereals production.

Great strides have also been made in coffee research. Since the early 1970s the Coffee Research Foundation has developed a high-yielding variety that is resistant to coffee berry disease and rust. This is a major improvement since farmers tend to spend about a third of their gross revenue on spraying.

Since the colonial period, Kenya's agricultural marketing system has been characterized by a high degree of regulation and control. Intervention increased after independence, and there are now more than a dozen parastatals involved in the marketing of output. Some cooperatives also engage in marketing. The marketing system of the large-scale producers is fairly simple. They sell most of their produce through the established, formal channels. The situation among smallholders is more complex. Their sales go through not only the formal channels but also a thriving informal system of local rural markets. The typical pattern of trade in the formal system is that the board receives deliveries from traders, cooperatives, or large farms, which it then delivers to processors and wholesalers. In the case of export crops, the board usually sells the processed products to overseas firms in Nairobi. Marketing boards have at times adversely affected output because of their illiquidity.

Kenya has two types of farm cooperatives: the older large cooperatives, which now are large national organizations, and the newer small cooperatives, which operate in the major smallholder regions. The cooperative movement has grown rapidly since independence. The most important union is the coffee union, which has a high turnover and a large membership. The cooperatives market, process, collect taxes, distribute inputs, and handle credit. The cooperative movement has been fairly successful in the most developed smallholder regions, but in the less advanced areas it has made only limited progress.

The government has also intervened in the marketing of fertilizers. As a result, smallholders have difficulty gaining access to fertilizer, whereas large-scale farmers are usually well supplied. Seeds distribution, however, is less problematic. Here, private traders supply small packages that are appropriate for smallholders. Fertilizer distribution has been hampered by price control, which has reduced margins to the point where it is not viable to provide dispersed smallholders with small quantities of fertilizers. The application of fertilizers has been profitable for maize, however (Ongaro 1988). Since 1987, the government has increased the availability of fertilizers and brought prices more in line with world market prices.

Indeed, price regulation has been an important part of government agricultural policy. In the 1970s the government sometimes maintained a gap

between domestic and world market prices, but in the 1980s, as just mentioned, reversed this policy. The producer prices for major food crops have been maintained at the level of import parity since the mid-1980s. There is still a desire to smooth out some fluctuations.

In 1980 the weighted average of producer prices (except for sugar) was 24 percent below import parity prices, and farm incomes were 7 percent below what they would have been with import parity prices (Cleaver and Westlake 1987, 26). This income transfer accrued to the consumer in the form of lower prices and to the government in the form of reductions in the subsidies to the parastatals. By 1986, however, the weighted producer prices (with the exception of sugar) were only 7 percent below import parity prices. This substantial shift in policy was of benefit to the farmers: whereas distorted prices in 1980 reduced the share of agriculture in GDP by 2.4 percent, the loss was down to 0.5 percent by 1986. In other words the price distortions were almost eliminated.

Over the past twenty years Kenya has initiated a number of development schemes, including the Special Rural Development Program, the Kenya Livestock Development Program, the Nordic Cooperative Project, and the Integrated Agricultural Development Program (IADP). The emphasis in these programs has tended to be on credit. Their results have been mixed (see Lele and Meyers 1989).

Since the late 1960s loans to smallholders have to a large extent come from the cooperatives, which can recover the funds from crop deliveries. The recovery rate is very good. It is more difficult to obtain loans from the Agricultural Finance Corporation (AFC), although it also provides some support to agriculture. Banks are only a minor source of credit. Normally, bank loans can only be obtained by a household member who gets his salary directly through the bank. Informal credit is only given between relatives. There is no system of private moneylenders, although a small consumption credit can sometimes be obtained from a local shopkeeper.

In the 1970s various kinds of different credit schemes were pushed by, among others, the World Bank (Raikes 1989). The IAPD program attempted to concentrate on the inexperienced, poorly trained, or corrupt unions. Since management was weak, the loans were obviously risky and the repayment rate was low. Instead of improving efficiency in agriculture, this credit program led to a misappropriation of funds and increased marketing costs. There is anecdotal but convincing evidence that credit was a "hard sell," and that extension officers went so far as to say that the money was essentially a grant if farmers were reluctant to accept it. It is therefore not surprising that the repayment rate on some of these schemes has only been about 30 percent.

One credit scheme that has been functioning well with a repayment rate of about 90 percent was organized and administered by the cooperative movement itself. It consists of loans of members' savings to other members. This scheme

was built up more gradually, and concentrated on more developed areas where there was an economic basis for the program.

In the AFC, only the large-farm component seems to be functioning, and the system is having difficulty delivering credit to the smallholders and achieving sustainable recovery levels. Most of the land in Kenya is located in sparsely populated areas of low potential, but the government is searching for methods of tapping even this potential, since it has been argued that "there is considerable scope for substantial increases in productivity in utilizing the resource potential of Kenya's arid and, especially, its semi-arid lands" (Johnston 1989). It remains to be seen whether any substantial progress can be made in this direction.

Although extension services expanded rapidly during the 1960s, the initial optimism about their potential faded in the 1970s. The government of independent Kenya was not much more successful than the colonial government had been in developing a viable strategy for developing agriculture in the poorer areas.

Linkages—An Analytic Framework for Kenya

The hypothesis explored in this chapter is that agricultural growth has positive repercussions throughout the economy. Such a linkage is not inevitable, but it can arise through several distinct mechanisms. This section investigates those mechanisms that may be pertinent in Kenya. The growth of per capita agricultural income can occur for three reasons: the relative price of agricultural output can rise, output might increase as a result of investment, or technical progress can raise the productivity of existing factors. At various stages, Kenyan agriculture has experienced each of these types of growth.

When the world price of agricultural output increases, there are three possible consequences for the rest of the economy. If the economy is small (in the sense of being a price taker on world markets), is fully open (in that all goods are internationally tradable), and has perfect factor markets, there can be no beneficial effects for the rest of the economy. Any expansion of agriculture is at the expense of the rest of the economy. Once nontradable goods are introduced, there are pecuniary but not real effects. That is, agricultural growth can benefit other sectors only to the extent that such growth causes relative prices to turn against agriculture, thereby transferring income to those engaged in other activities. With pecuniary effects, other sectors can indeed benefit from agricultural growth, but since these benefits are only transfers, in aggregate this is not a real gain for the economy. When market imperfections are introduced, agricultural growth can give rise to income gains in other sectors over and above those arising from transfers. Transfers induced by agricultural growth may be referred to as a pecuniary multiplier, and growth in nonagricultural output induced by agricultural growth may be considered a real multiplier. Under certain

circumstances, an improvement in the agricultural terms of trade can give rise to either of these types of multiplier.

An Economy without Multiplier Effects

In a small, fully open economy with perfect factor markets, an improvement in the agricultural terms of trade generates no multiplier effects. Kenya is not a fully open economy: there are government restrictions on trade, and many goods and services are intrinsically not tradable in world markets. Nor are its factor markets "perfect": labor and capital are to varying degrees immobile between sectors and there are some price rigidities. Nevertheless, a useful benchmark case is provided by the linkages that might be expected were this the case. The essential feature of such an economy is that the relative price of goods would be determined on world markets over which Kenya has virtually no influence. In turn, factor prices would be determined by technology and the relative price of goods. As a result, linkages from agriculture would work only through factor markets. There could be no pecuniary multiplier, let alone any real multiplier, via price changes that would generate income transfers. If the world prices of agricultural produce rose, then agriculture would expand at the expense of other sectors. It would bid factors away from other sectors and drive up the relative price of labor (the factor used most intensively in agriculture). Agricultural and nonagricultural growth would be negatively correlated and causally connected.

Pecuniary Multiplier Effects

Once it is no longer assumed that the prices of all goods are set on world markets, agricultural growth due to an improvement in the terms of trade will give rise to pecuniary multiplier effects. Growth leads to changes in relative prices, which transfer income to other sectors. In Kenya, pecuniary multiplier effects are generated by three distinct mechanisms. First, a change in consumer demand caused by higher agricultural incomes tends to bid up the price of nontradable goods and services. Second, some of the obstacles to tradability are government-imposed trade restrictions, and these are altered by agricultural performance. And Third, agricultural shocks affect investment, which in turn causes powerful repercussions on nontradable capital goods. Agricultural shocks may thus cause the kinds of construction booms and slumps that have been a striking feature of the Kenyan economy.

Since many goods and services in Kenya are nontradable, their prices are divorced from world markets. This distinction between tradables and nontradables cuts across that between agriculture and the rest of the economy. Most of the nonfood crops are fully traded (notably, coffee and tea). In an average year, however, Kenya is self-sufficient in food. In the period under consideration, this was probably the case because of the high costs of transporting grain. Because of the unpredictability of food production, trade depends in part on the

variance in production (part being accommodated by variations in stocks and in consumption). Food may therefore be characterized as nontraded save for the variance in production: an increase in mean production would lower domestic prices. This distinction between tradable and nontradable agriculture is important because of the different transmission mechanisms on the rest of the economy. During the study period, the tradable component of agriculture in Kenya was subject to positive price shocks, notably coffee booms, whereas the nontradable sector was subject to negative quantity shocks, notably droughts. A favorable price shock in the tradable sector has Dutch disease effects. As income is spent, the price of nontradables is bid up, and resources are attracted there away from the nonboom tradable sector. An unfavorable quantity shock in the nontradable sector drives up the price of these nontradables so that resources may even flow into the activity. Since incomes are lower, however, the demand for other nontradables falls, and there is a contraction in the nonslump nontradable sector.

In Kenya, the nonagricultural tradable sector is primarily import-substitute manufacturing. This activity is subject to quantitative restrictions (QRs) on imports. Were the QRs fixed, manufacturing would therefore be a nontradable activity at the margin. The coffee booms would therefore have raised prices in this sector, whereas the drought would have lowered them. During the study period, however, QRs were adjusted as the primary macroeconomic policy instrument by which the balance of payments was equilibrated. In other words, trade policy was endogenous to the macroeconomic environment. When the agricultural shock took the form of a coffee boom, there was a direct increase in foreign exchange earnings, which made it possible to liberalize trade. Whenever Kenya suffered a drought, food had to be imported, the balance of payments deteriorated, and QRs had to be tightened. These variations in trade policy tended to reverse the price effects on manufacturing, which would have taken place had QRs been constant. Recall that were QRs constant, the qualitative behavior of manufacturing would have resembled that of the nontradable sector, benefiting from agricultural growth through higher relative prices, which is a pecuniary multiplier. Because trade policy was endogenous to foreign exchange availability, however, agricultural growth triggered trade liberalization, which inflicted a negative transfer on manufacturing. Hence, the pecuniary multiplier was negative.

The remaining mechanism behind a pecuniary multiplier affects the construction sector. An agricultural shock changes current income in relation to permanent income and thus leads to a change in savings. In Kenya, the main coffee boom led to a massive increase in savings, the main drought to dissavings. Because the economy is not well integrated into world capital markets (largely because of exchange controls), these changes in savings cause corresponding changes in investment. Since tradable capital (such as machinery) and nontradable capital (such as buildings) tend to be complementary, large

changes in the demand for investment in the aggregate tend to be spread over both tradable and nontradable capital. The sector that produces nontradable capital goods, namely construction, is therefore subject to large swings in demand resulting from agricultural shocks.

Pecuniary multiplier effects of agricultural growth are good news for nonagricultural sectors but bad news for agriculture. If they are powerful, they indicate that the changes in primary income in agriculture will be transferred to other sectors. However, these transfers, by their nature, leave aggregate income unaffected. The mechanisms discussed next enabled agricultural growth to provide the economy with a free lunch.

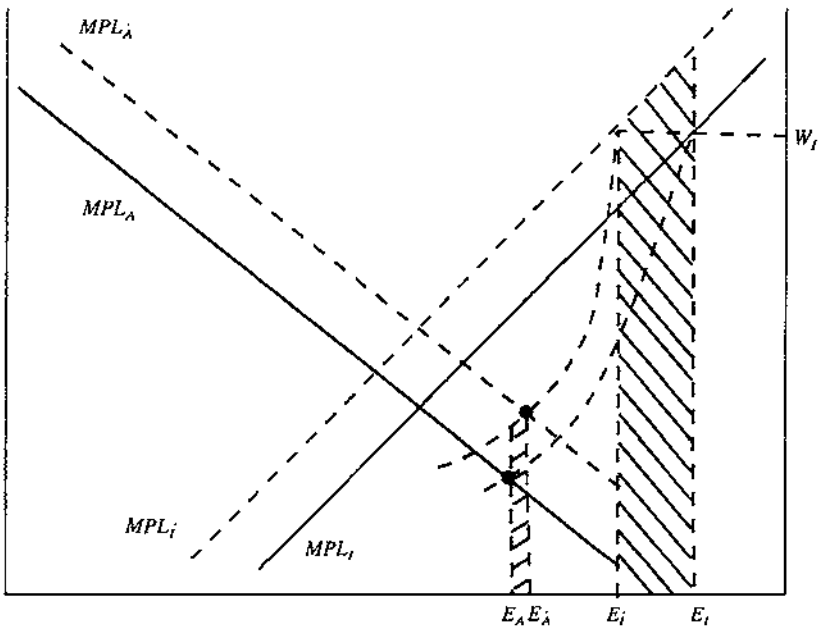
Real Multiplier Effects

As mentioned earlier, there would be no multiplier effects in a fully open economy with perfect factor markets, but if the assumption of a fully open economy is relaxed, three mechanisms can be found for a pecuniary but not a real multiplier. Now suppose the assumption of perfect factor markets is relaxed. In this case market imperfections can give rise to a real multiplier via three mechanisms as well. The first is labor market rigidity. Such rigidity leads to either unemployment or underemployment, which can, depending on the further specification of the economy, be reduced by agricultural growth. The second is a rigidity in the market for foreign exchange and, in consequence, for intermediate inputs. Agricultural growth related to a terms-of-trade improvement can increase the supply of foreign exchange and thereby reverse import compression. The third mechanism is the credit market. A savings boom resulting from a favorable agricultural shock can release the economy from financial repression and thereby improve the allocation of capital.

Many observers of Kenya's labor market (Harris and Todaro 1970; Stiglitz 1974; Fields 1975) have argued that real nonagricultural wages are fixed above the supply price of labor. The wage premium might induce open unemployment along the lines of Harris and Todaro, or underemployment in the sense that people are employed in the agricultural sector (or some third sector) at a marginal product much below what they would have in the fixed-wage sector. Now suppose that the nonagricultural sector is (in whole or part) producing nontradable goods. An increase in agricultural income would raise expenditure on nontradables and thereby drive up the marginal revenue product of labor in the sector. As a result, more labor could be employed. Either open unemployment would fall or underemployment be reduced. In either case, output in the aggregate would expand because the waste associated with the initial labor misallocation was reduced.

Figure 7.1 illustrates the analysis. There are two sectors, agriculture and industry, in which the marginal revenue product of labor schedules are given by MPL_A and MPL_I, respectively. There is a fixed wage of W_I in the industrial sector, limiting employment to E_I. A Harris-Todaro process generates unem-

FIGURE 7.1 A real multiplier from a labor market distortion



Note: MPL_A = marginal revenue product of labor schedules in agriculture; MPL_I = marginal revenue product of labor schedules in industry; W_I = a fixed wage in the industrial sector; E = employment.

ployment of E_A–E_I. Exogenous growth in agricultural income raises the marginal product of labor in the sector to $MPL_{\dot{A}}$. Endogenous growth of income in industry, through a pecuniary multiplier, raises the marginal product in that sector to $MPL_{\dot{I}}$. As a result, industrial employment increases to $E_{\dot{I}}$ and agricultural employment to $E_{\dot{A}}$. The real multiplier stems from the improvement in labor allocation, shown as the two shaded areas. In contrast to the previous cases, here agricultural expansion has a multiplier effect on aggregate output.

The above multiplier effect depended on misallocation in the labor market: too little labor was employed in the nonagricultural sector. Agriculture may also have a multiplier effect if foreign exchange is misallocated. If the exchange rate is overvalued and foreign exchange rationed, the manufacturing sector may be constrained by the lack of imported inputs. As a result, sector-specific capital in the manufacturing sector may be underused (in effect, unemployed). Firms would be prepared to pay more for foreign exchange generated by the agricultural sector, but the fixed exchange rate policy would prevent them from doing so. In such circumstances, an autonomous expansion of the tradable component of agricultural income (either through higher world prices or greater

output) can again give rise to a multiplier effect on aggregate output, as idle capital is brought into use in the manufacturing sector.

A third multiplier effect might occur if the economy were financially repressed, as was the case in Kenya for much of the study period. Interest rate ceilings would give rise to a gap between what borrowers are willing to pay at the margin and what savers receive. They would also induce banks to lend to projects that are safe but that have a low return, rather than to more risky projects with higher expected returns. In these circumstances, an expansion in savings could float the economy off financial repression by driving down the market-clearing interest rate below the ceiling. Financial intermediation would then reap the benefits previously missed through intertemporal resource misallocation. The scale of investment would cease to be suboptimal and the allocation of savings between firms would cease to be biased against projects with a higher return. A boom in agricultural incomes with consequent high savings rates, such as the one in Kenya during the late 1970s, can therefore generate an expansion in aggregate output.

All three of these mechanisms can operate together. For example, some firms in the manufacturing sector might be rationed in the capital market, others might be rationed in the foreign exchange market, and both groups might have wage rates above the supply price of labor. An increase in agricultural income might expand the sector through extra demand for its output, which would increase the marginal revenue product of labor; extra foreign exchange, which would lead to the utilization of previously idle capital; and extra savings, which would enable capital-starved firms to borrow. The extra output might have little opportunity cost if the capital is sector-specific and labor has a much lower marginal product in the activities from which it is drawn.

Technical Progress Introduced

So far, the discussion has focused on growth in agricultural income brought about by an improvement in the agricultural terms of trade. This has made it possible to distinguish between real and pecuniary multipliers, but it has abstracted from growth induced by technical progress and investment. Consider now the effects of technical progress in the agricultural sector.

Since technical progress in the agricultural sector increases incomes, it can give rise to the pecuniary and real multiplier effects just discussed. However, such progress usually has additional real effects on the rest of the economy, although these need not be positive. There are two offsetting effects. First, because technical progress raises factor productivity, the return on factors used in agriculture increases. This induces factors to shift into agriculture from the rest of the economy. At the same time, technical progress increases the supply of factors available to the economy measured in efficiency units. Two forces can prompt some of these extra factors to locate outside the agricultural sector. The first is if agricultural technical progress happens to be biased toward saving the

factor used intensively in the nonagricultural sector. The second is if, as discussed above, a pecuniary multiplier raises the return to factors in the nontradable part of the nonagricultural sector. In either of these cases, it is possible for technical progress in agriculture to induce a shift in factors out of agriculture into the rest of the economy. Since the remaining factors in agriculture are more productive, agricultural output will have increased, but this will have induced expansion elsewhere in the economy. Hence, agricultural technical progress can give rise to a real multiplier. However, a priori it is also possible for there to be a net shift of factors into agriculture, in which case the real multiplier would be negative.

Agricultural Investment Introduced

Investment in agriculture may or may not be at the expense of investment in other sectors, depending on the degree of integration of the capital market. At one extreme, if the national economy is fully integrated into the world capital market, investment decisions will be completely separated from domestic savings decisions. Extra agricultural investment will not be at the expense of investment elsewhere in the economy since at the margin it is financed externally. At the other extreme, capital markets may be so segmented that savings in the agricultural sector are channeled exclusively into agricultural investment. Again, increased agricultural investment will not be at the expense of investment elsewhere in the economy. Only in the intermediate case—in which there is a well-functioning domestic capital market that is isolated from the world market—will agricultural investment be at the expense of investment elsewhere, since it is using savings that would otherwise have been harnessed in some other sector. If agricultural investment has no opportunity cost in terms of investment in other sectors (i.e., either the fully integrated or the fully segmented capital market), then its consequences are closely akin to those of agricultural technical progress. The extra capital can induce labor to shift into or out of the sector and hence it can have either positive or negative effects on real output in the rest of the economy. In addition, the income growth resulting from the investment can cause pecuniary or real multiplier effects, as would a terms-of-trade improvement. If, however, agricultural investment is at the expense of nonagricultural investment, there will be a loss of output in the rest of the economy in relation to what would have happened otherwise.

A Preliminary Conclusion

From the foregoing discussion of the possible links between an increase in agricultural incomes and those in the rest of the economy, it is clear that income can be transferred (the pecuniary multiplier) if there are nontradable goods. More important, income can be augmented in real terms in the aggregate (the real multiplier) if there are distortions in the economy or if the growth is due to technical progress or investment. The first of these effects constitutes a shift

toward the production frontier of the economy, the other two constitute an outward shift of the frontier. However, an outward shift in the frontier does not guarantee a positive real multiplier. Rather, it is dependent on the type of technical progress and the state of the capital market. It is therefore an empirical matter whether agricultural growth moves the economy to its frontier, shifts the frontier, or merely moves around the frontier. The next question to consider is how these links function in Kenya.

Links to Nonagricultural Sectors

The links from agriculture to other sectors of the economy took three main forms: macroeconomic shocks, agricultural supply shocks, and a spatial concentration of activities.

TRANSMISSION FROM MACROECONOMIC SHOCKS: THE COFFEE BOOM AND THE DROUGHT. During the study period, agriculture in Kenya experienced two shocks large enough to have discernible macroeconomic consequences. The first of these was the coffee boom of 1976–79 and the second was the drought of 1983/84. As explained earlier, Kenya experienced other agricultural shocks as well, but the coffee boom and the drought were the largest shocks of each type: positive price shocks in the tradable sector and negative quantity shocks in the nontradable sector.

The coffee boom was the result of a frost in Brazil that damaged but did not destroy the Brazilian tree stock. During the boom Kenya's barter terms of trade improved by 54 percent, but this was recognizably a temporary event until Brazilian output recovered. By 1980 the terms of trade had reverted to their 1975 level. In the intervening four years, the improvement in the terms of trade raised real income by about 5.4 percent. Unlike other coffee growing countries, Kenya decided (against the advice of the World Bank and received academic opinion) to pass the entire price increase on to coffee growers. About half of the coffee grown in Kenya was produced by small farmers who were relatively recent entrants into the activity. Hence, the boom accrued in the first instance to many thousands of small farmers who had no previous experience of such a remarkable event (it was the largest price increase for coffee in the entire century).

Coffee farmers appear to have recognized that the windfall would be short-lived since they saved about 70 percent of the income; their normal saving rate was less than 5 percent (Bevan et al. 1989). In the short term, most of these savings took the form of deposits in rural financial institutions. Fieldwork in Muranga (where about 15 percent of coffee farmers lived) showed that by the end of the first year of the boom savings deposits measured in relation to their long-term trend had increased by about half of the windfall coffee income. In the longer term, farmers converted these financial savings into real assets: farm investments and housing improvements. By the early 1980s, savings deposits in Muranga were back to their long-term trend value.

The boom in farm incomes thus led to a large increase in savings and a smaller, but still significant, increase in expenditure on consumption. Both of these responses had repercussions throughout the economy. First, the financial savings forced down the market-clearing interest rate well below the legal ceiling on interest rates. The best guide to market interest rates is the rediscount rate on treasury bills, which in this instance dropped below 1 percent during the course of 1977. Real interest rates were therefore heavily negative. Even so, banks had difficulty finding sufficient borrowers, and their liquidity ratios rose to a peak that was double the legal minimum requirement. The private sector of the economy had a very high investment rate out of the windfall, which in the aggregate amounted to about 90 percent of its windfall income (Bevan et al. 1990). However, this very high rate was in part a consequence of large pecuniary multiplier effects. Income was transferred from all farmers (including non-coffee farmers) to urban firms as coffee boom expenditure enabled firms to increase prices. This was a transfer from those who had a low savings rate out of their normal income to those with a high rate. The high aggregate savings rate was therefore a compound of a high savings rate on the part of the primary windfall recipients (coffee farmers) and a transfer from low savers (other farmers) to high savers (firms).

Consider, first, the pecuniary multiplier effects of the boom. The high savings and investment rate in the private sector implied a fairly modest increase in consumer expenditure but a large increase in the demand for nontradable capital goods. The main pecuniary multiplier effect was therefore likely to be a construction boom rather than Dutch disease. This indeed appears to have been the case, according to estimates of the effects of the boom on consumption and relative prices arrived at through two methods: by positing a simple counterfactual based on the assumption that the economy in the preboom years was in equilibrium; and by constructing a computable general equilibrium model of the economy (Bevan, et al. 1990). Both approaches have their limitations, but they have the virtue of being independent measures of how the economy would have evolved in the absence of the boom. As far as consumption is concerned, both approaches lead to the conclusion that the effect of the boom was quite modest. The simple counterfactual suggests that at the peak of the boom consumption in real terms was 4.6 percent higher because of the boom, while the CGE model generates the slightly lower figure of 3 percent. The relative price of consumer nontradables rose slightly between 1975 and 1977–78 (the peak of the boom). The CGE model predicts a larger increase with the boom (partly because it suggests that in the absence of the boom the relative price of consumer nontradables would have fallen), but there seems no compelling reason to give this prediction much credence. However, even a modest increase in relative prices can produce a sizable transfer of income from the agricultural sector.

The construction boom, by contrast, was substantial. Approved urban building plans rose by about 80 percent between 1975 and 1978. Rural con-

struction, on which there is no comparable evidence, probably increased even more substantially. According to survey evidence, coffee farmers invested heavily in housing improvements. The construction sector expanded substantially in relation to GDP, and the relative price of its output rose sharply. (On this point the simple counterfactual and the CGE model are in broad agreement.) The price rise constituted a large pecuniary multiplier whereby a primary boom in the agricultural sector was transferred to the construction sector.

As explained earlier, a pecuniary multiplier may also come into effect as a result of an endogenous trade liberalization that squeezes the import-competing manufacturing sector. Between 1975 and 1978 ex-factory prices of manufactures fell by about 30 percent in relation to the CIF cost of manufactured imports, which is consistent with the view that trade policy was driven by the availability of foreign exchange. This decline suggests that there was a substantial transfer from the manufacturing sector. Nevertheless, manufacturing output grew rapidly. Whereas in the three years preceding the boom, value added had increased by 26 percent, in 1975–78 it increased by 49 percent, the highest three-year growth rate in the study period.

There are three potential explanations for this growth. First, despite the overall decline in relative prices brought about by the trade liberalization, some firms undoubtedly managed to maintain quota protection, since the liberalization took the form of a piecemeal relaxation of quotas, and thereby benefited from higher prices, as in the case of nontradable goods. Second, there may have been a real multiplier effect through the increased availability of imported inputs, a possibility discussed further below. Third, the savings boom gave rise to an investment boom in the sector. Not only was overall investment greatly increased, but it was skewed toward manufacturing. Thus, the increase in output reflected a shifting of the supply curve to the right rather than a movement up it.

The induced trade liberalization gave rise to a further and ultimately central pecuniary multiplier. Because the government relied on import duties for its revenue, the relaxation of import quotas generated a large increase in revenue. Thus, although the government chose not to tax the primary windfall, it nevertheless gained around half of it in extra revenue through the taxation of second-round expenditures. Initially, the government budget moved into surplus, but the spending departments responded by massively inflating their bids for expenditure. As the terms of trade reverted to their preboom level during 1977–80, government expenditure jumped five percentage points of GDP, and the budget moved into heavy deficit. It took until the mid-1980s to bring the budget back under control. Indirectly, the coffee boom thus led to a public expenditure boom, which itself had powerful repercussions on the rest of the economy. However, these indirect consequences are not considered here.

As for real multipliers, recall that they may come into effect in three ways: through distortions in labor, credit, or foreign exchange markets. Distortions in

the labor market are incorporated into the CGE model. The modern sector is assumed to pay a wage above the supply price of labor so that the expansion of employment in the sector generates output well in excess of the opportunity cost of that labor elsewhere in the economy. Furthermore, as the returns to labor rise in agriculture, the supply of household labor is increased. The opportunity cost in terms of foregone leisure is not treated as an offsetting cost (just as unemployment is not valued as a supply of leisure in national accounts). When the effects of the boom on real income are measured for the period 1976–79 and then discounted back at 10 percent to 1975, the CGE model yields an increase of 6.7 percent in the present value of real income. The pure gain in terms of trade is only 5.4 percent, so the residual 1.3 percent is attributable to either the returns on boom-induced investment or to real multiplier effects. The returns to boom-induced investment during the period to 1979 are estimated by calculating windfall investment (as the difference between actual investment and a counterfactual) and assuming a 10 percent rate of return and a one-year gestation period. Since the bulk of windfall income accrued in 1977, the yield on windfall investment was negligible until 1978 and 1979. Again discounted back to 1975, the present value of the returns from this investment raised real income by only 0.2 percent over the whole period 1976–79. This estimate implies, residually, that the labor market effects, which can be regarded as a component of the real multiplier through the labor market, amounted to 1.1 percent extra real income. Since the primary windfall was 5.4 percent, the value of the real multiplier from the agricultural windfall onto the rest of the economy was 0.20.

To reiterate, other than the gain arising from the unwinding of labor market distortions, the potential sources for a real multiplier effect were from credit market and foreign exchange market distortions. The coffee boom led to a temporary financial liberalization as interest rates fell well below the official ceiling. Since foreign exchange therefore became easier to acquire, there was a substantial trade liberalization. Both of these events can be presumed to have enhanced allocative efficiency. Between them they probably account for the bulk of the unusually rapid growth in manufacturing output during the boom. Although the fall in interest rates and the reduction in trade restrictions can be quantified, it is not possible to move from this to the gain in GDP and hence to a value of the real multiplier.

In the decade before the second agricultural shock, the drought of 1983/84, value added had grown at an average rate of 4.5 percent. In 1984, agricultural output fell absolutely and was 10.7 percent lower than it would have been had it maintained the growth of the previous decade. At 1982 prices, this amounted to a shortfall of K£ 112 million, or 3.6 percent of 1984 GDP. Recall that the coffee boom constituted a direct gain of 5.4 percent in real income over a four-year period. Hence, the drought was followed by both a shorter and smaller, but not negligible, deviation in income. Farmers had

reacted to the coffee boom by building up assets. They might have been expected to react to a drought in a symmetrical fashion. However, a possible asymmetry is that whereas it is always feasible to accumulate assets, it is not always feasible to accumulate debts, since there may be no willing lender. Whereas for the coffee boom period, savings behavior can be estimated through a purpose-designed survey, there is no survey source for the drought. At the aggregate level, the national accounts identify two private agricultural assets, cattle and land improvement. In the years from 1972 to 1987, except 1984, annual investment in cattle averaged K£ 0.65 million, with no clear trend. In 1984 investment was −K£ 3.44 million, the largest destocking in the period. Hence, there was a turnaround of K£ 4.1 million. Similarly, investment in land improvement averaged K£ 8.4 million (again with no clear trend), whereas in 1984 it was only K£ 5.8 million (the lowest since 1973); a turnaround of K£ 2.6 million. The changes in discernible assets are therefore consistent with the hypothesis that agricultural households responded to the drought by reducing their assets, but they do not make it possible to estimate how powerful these changes were. During the coffee boom, the predominant pecuniary multiplier effect had been transmitted from the savings changes onto investment and thereby to a construction boom. The drought might have triggered the same transmission mechanism: reduced savings leading to a construction slump. There is, indeed, some evidence for such an effect. Output of the construction sector in 1984 was lower than at any other time during 1978–87. The extent of the decline in construction due to the drought is difficult to estimate because there is no "normal" year for the sector. In the late 1970s and early 1980s, the sector was booming in response to the coffee boom and thereafter it was in relative or even absolute decline because of the oil shock and public expenditure reductions. Thus, although there was some growth in GDP, which presumably provided some impetus for expansion, the construction output after 1978 showed no clear trend: output in 1987 was virtually identical to that in 1978. As an approximation, construction output in 1984 can be compared to the average for the rest of the period 1978–87 (all at 1982 prices). On this basis, output during the drought was reduced by 11.7 percent, or by K£ 13.6 million.

Potentially, the other transmission mechanisms from agricultural income that appeared to be operating during the coffee boom also applied during the drought. Although there might be some theoretical reasons to expect differences, as already explained, it is not possible to discern them in the data because the aggregate effects of the drought were small in relation to GDP. In 1984, the terms of trade improved modestly, adding about K£ 90 million (at 1982 prices) when compared with the level that would have been generated by the 1982 terms of trade. Hence, although the drought caused the government to import food and thereby reduced foreign exchange availability in relation to the non-drought counterfactual, this was broadly offset by the changes in the terms of trade. As a result, one should not expect to find any deterioration in foreign

exchange availability in relation to its previous level, and hence a comparison of predrought and drought performance cannot be used as a guide to the counterfactual.

The advantage of studying linkages by means of shocks is that there is a greater likelihood of identifying consequences by examining large events. However, it is possible that relationships that hold for short-term fluctuations in agricultural income do not carry over to changes in agricultural growth over long term.

This analysis of the two major agricultural shocks provides evidence for both pecuniary and real multipliers. The pecuniary multiplier operated through the impact of changes in savings on the construction sector, through endogenous changes in trade policy, and through Dutch disease effects on the price of consumer nontradables. Of these, the first was probably the most important and was discernible in both the coffee boom and the drought. This suggests that one of the key transmission mechanisms from agriculture to the rest of the economy is asset markets. Care should be exercised, however, in extrapolating this evidence from agricultural shocks to long-term agricultural growth. It is quite possible, indeed likely, that whereas the propensity of farmers to save (or dissave) out of windfall gains (or losses) is very high, the propensity to save out of normal income is very low. A higher trend rate of agricultural growth might therefore have had little impact on the construction sector, even though variations in agricultural income appear to have been highly important. The same criticism could be leveled at the transmission mechanism operating through trade policy. Although imports were liberalized during an export boom, it does not necessarily follow that had Kenyan agricultural exports been growing at a faster rate there would have been a stronger trend toward liberalization. An alternative would be for the government to have had a faster rate of monetary growth or a slower rate of exchange rate depreciation. Even in the short run, Dutch disease effects (a change in the price of nontradable consumer goods) were modest. Had agriculture grown faster, the Dutch disease effects might have been only negligible, since the long-term supply elasticity of nontradable goods might have been high once factors were able to move into the sector.

Since the real multiplier operated through effects in the labor, credit, and foreign exchange markets, the same critique can be applied: relationships that hold in the short term in response to shocks may not extrapolate well to changes in the trend growth rate. The credit effect is manifestly a short-term phenomenon: a positive shock leads to a savings boom, which lowers the interest rate below the official ceiling and thereby achieves a temporary financial liberalization. Just as with the pecuniary multiplier onto the construction sector, it is unlikely that this would apply to a higher trend growth of agricultural income. The foreign exchange liberalization is closely related to trade liberalization. As just mentioned, it does not necessarily follow that a higher growth rate of agricultural exports would have reduced the intensity of foreign exchange

rationing. However, it seems likely that even if some of the benefits of higher growth had been dissipated in faster monetary growth and slower exchange rate depreciation, there would have been some easing of foreign exchange rationing. The most likely of the short-term real multiplier effects to have carried over into the long term is that generated in the labor market. Owing to exceptional historical circumstances, the real wage level in the modern urban sector during the 1950s and early 1960s was both above the supply price of labor and unsustainable (Collier and Lal 1986). It seems that during the 1970s this wage premium was gradually eroded as agricultural incomes rose and urban real wages fell. Faster agricultural growth would, on this analysis, have eroded the premium more rapidly and in the meantime have generated urban jobs that used labor with an opportunity cost below its productivity.

TRANSMISSION FROM AGRICULTURAL SUPPLY SHOCKS OVER THE ENTIRE PERIOD. The effects on real output can now be examined for the entire study period. Only the real multiplier is considered here. The dependent variables are therefore real output in construction, consumer services, and manufacturing. According to the theoretical analysis, those are the sectors that may be subject to a real multiplier. The main explanatory variable is real output in agriculture. As the coffee boom episode demonstrated, however, income changes may not only be due to changes in agricultural output but also to changes in world prices. Changes in real income brought about by changes in the terms of trade are measured in relation to their 1982 level (all at 1982 prices) and are treated as an additional explanatory variable. Since the remaining source of exogenous changes in demand is the government, a series on the real output of government services must also be included (this is measured in the national accounts by the quantity of its inputs, as is customary for government services). This explanatory variable can be used to investigate whether government expenditures crowd in or crowd out other sectoral outputs.

To properly assess the indirect effects of the linkages from agriculture to the rest of the economy, it would be necessary to use a CGE model. For the purpose of this discussion, however, reduced-form econometric techniques are used to establish any linkage effects from agriculture to other sectors of the economy. Nevertheless, this analysis is tentative, and the results must be interpreted with caution. The analysis is confined to the effects of agricultural output (A) on manufacturing (M), construction (C), and nontradable private services (S).[1] The effects from two exogenous variables are taken into account: namely, provision of government services (G) and changes in real income arising from changes in the external terms of trade (T).

Simple correlation tests show that there is a positive correlation between all sectors contemporaneously, but mere correlation cannot, of course, be taken

1. We include trade, restaurants, hotels, transport and communications, finance, private household services, and other services.

to prove that there is a significant relationship, or to indicate the direction of causality.

Slightly more advanced tests can be used to try to get more robust conclusions. The purpose of these tests is to see if there is a long-run relationship between the variables. The first is the augmented Dickey-Fuller test. The *t* values show that the hypothesis of a unit root cannot be rejected in any of the cases of agricultural (A), manufacturing (M), construction (C), or services (S) output with one or two lags or for agricultural output with three lags. The variables concerned are thus not stationary: all of them have a tendency to grow over time. This creates a potential problem: when variables are nonstationary, time-series regressions specified in levels of variables often lead to erroneous inferences. The obtained relationship may be entirely spurious. When variables are nonstationary, the next step in the analysis is to investigate whether they are co-integrated. If two variables are co-integrated, there is a sustained relationship between them. In that case, it is possible to run regressions with the level estimates of the variables.

In the co-integration test, one takes the first differences on the residuals obtained from an OLS regression of, for example, A on M, and then applies the augmented Dickey-Fuller unit root test again. The results from the co-integration test in this study are mixed. For agriculture and industry, *t* values are not significant, and there is strong serial correlation without the lag. Agriculture and construction are significantly co-integrated, however, so for this relationship (which the analysis of shock episodes suggested might be central) the analysis can proceed by using levels of variables. It should be noted, however, that the co-integration test is weak and that the number of observations is rather small, so the results are uncertain.

In order to investigate relationships between variables that are not co-integrated, one must transform the variables by differencing, since this makes these series stationary, yielding consistent coefficient estimates. The approach used here is to first log all sectoral variables and then take the first differences. This means the analysis is conducted in terms of growth rates for all variables except *T*, for which the level estimate is used (since *T* is sometimes negative, one cannot take its logarithm).

The objective here is to determine how agricultural growth affects the growth of manufacturing, construction, and private services, controlling for government expenditures and income shocks arising from changes in the external terms of trade. Different variations of the following formulation can be tried with different numbers of lags (see table 7.2).

$$DLX_i = h(DLA, DLG, DT). \tag{7.1}$$

Note that the *F*-form value in the first regression (table 7.2, A) is a little high, which indicates some serial correlation. However, neither in this formulation nor in any other similar formulations did agriculture appear to have a

TABLE 7.2 Impacts on manufacturing growth with dependent variable DLM

A			B		
Dependent Variable	Coefficient	Standard Error	Dependent Variable	Coefficient	Standard Error
DLM1	0.405	0.187	DLM1	0.432	0.166
DLA	−0.026	0.156	DT	0.00010	0.00005
DLA1	0.083	0.141	DT1	0.00013	0.00006
DLG	0.030	0.400	Constant	0.036	0.024
DLG1	0.127	0.894			
DT	0.00010	0.00005			
DT1	0.00012	0.00006			
Constant	0.036	0.024			
$r^2 = 0.493$,	$F = 2.22$,	f-form = 5.29	$r^2 = 0.457$,	$F = 5.61$,	F-form = 4.38

SOURCE: Authors' computations.
NOTE: The critical F-form value at the 5 percent level about 4.4.

significant effect on manufacturing. But there was a consistently significant effect of changes in the terms of trade variable, which suggests that income shocks arising from the terms of trade (many of which are agricultural) are an important driving force behind manufacturing growth (see also table 7.2, B). This force may operate through its effect on the balance of payments constraint, changing the ability of industry to import essential inputs.

In table 7.3, A, the dependent variable is construction output. Recall that the co-integration test makes it possible to investigate the relationship between

TABLE 7.3 Impacts on construction and the growth of private services

A			B		
Dependent Variable	Coefficient	Standard Error	Dependent Variable	Coefficient	Standard Error
LC11	0.689	0.145	DLS1	−1.44	0.248
LA	0.805	0.402	DLA	0.292	0.166
LA1	−0.475	0.397	DLA1	0.145	0.154
LG	−1.254	0.183	DLG	0.710	0.417
LG1	1.084	0.351	DLG1	−0.628	0.395
T	−0.00010	0.00013	DT	−0.00004	0.00005
T1	0.00020	0.00012	DT1	0.00004	0.00005
Constant	−0.275	1.933	Constant	0.042	0.022
$r^2 = 0.93$,	$F = 31.16$,	F-form = 5.29	$r^2 = 0.315$,	$F = 1.05$,	F-form = 0.15

SOURCE: Authors' computations.

this output and agricultural output using levels of variables (instead of changes in levels). The regression reveals a powerful, statistically significant and contemporaneous relationship between agricultural output and construction output. A 1 percent change in the former is associated with a 0.8 percent change in the latter. This supports the inferences drawn earlier about the consequences of the coffee boom and the drought. In table 7.3, B, the dependent variable is the output of marketed consumer nontradables (i.e., various types of services). This forces the investigation back onto changes in levels and reveals no significant relationship between agricultural output and the output of these services.

The objective of the final test performed in this study was to determine whether agricultural growth causes growth in the other three sectors in the sense of Granger. This was done by means of two regressions, A and B. In regression A, X is a function of lagged values of itself. In regression B, X is a function of lagged values of X plus lagged values of another variable Y. Then, Y causes X if, compared to A, the information in B significantly improves one's ability to predict X. This can be formulated as follows:

$$\text{A: } X = X_0 + \Sigma_i \beta_i X_{t-i} + \epsilon_i \tag{7.2}$$

$$\text{B: } X = X_0 + \Sigma_i \beta_i X_{t-i} + \Sigma_i \gamma_i Y_{t-i} + \epsilon_i. \tag{7.3}$$

We say that Y causes X if B has significantly smaller residuals than A. Given the small number of observations in the present sample, caution must be exercised in drawing any conclusions from them. A problem with annual data is that the impact may well happen within the year, in which case the causality will not be picked up with this test. Some of the results are reported in table 7.4. Different variations were tried, but they did not significantly change the results.

Recall that the only significant relationship found between agriculture and the other sectors of the economy is the relationship with construction. The

TABLE 7.4 Granger causality tests

Test	F-Value
LM on LA	$F(2,19) = 0.94$
LA on LM	$F(2,19) = 4.72$**
LC on LA	$F(2,19) = 8.31$***
LA on LC	$F(2,19) = 2.10$
LS on LA	$F(2,19) = 0.61$
LA on LS	$F(2,19) = 2.96$*

SOURCE: Authors' computations.
NOTE: In all the reported cases, 1 to 2 lags are used for both variables.
* = significant at the 10 percent level.
** = significant at the 5 percent level.
*** = significant at the 1 percent level.

Granger test supports the interpretation that causality runs from agricultural output to construction (Granger causality being satisfied at the 1 percent level). According to the Granger test, any relationship between agriculture and manufacturing and services, insignificant on the previous analysis, run from these other sectors to agriculture.

Thus there is again no evidence that agricultural growth stimulates either manufacturing industry or consumer services. In an economy where industry is highly dependent on inputs from agriculture, one might expect a causal relationship, but it may be that Kenya's import-substituting industry is not very dependent on inputs from agriculture. To the extent that imported inputs determine its growth rate, as explained earlier, improved terms of trade did have a significant and positive effect on manufacturing output.

LOCATIONAL ASPECTS OF GROWTH AND LINKAGES. So far, the analysis has been confined to linkages at the national aggregate level between agriculture and other activities. A striking feature of Kenya's economy, however, is the spatial concentration of activity. The manufacturing and service sectors are located in large part in Kenya's main city, which is in turn located in the most prosperous agricultural region.[2] Nonagricultural activities that are geographically dispersed tend not to be integrated into a national market. Thus there are two rather distinct spatial linkages. One is that national agricultural income to some extent affects activities that are concentrated in a few urban areas. In turn, urban activity feeds back selectively on rural areas through migration and remittances. The other linkage is that within small rural localities the performance of locally based nonagricultural activities appears to be quite closely linked to agriculture because they are nontradable outside the locality.

The question of interest here is to what extent is agriculture the basis for the development of small-scale enterprises in the rural areas? Official survey data on such enterprises covered all activities carried out in the open air, in market stalls, and in temporary structures (Kenya 1986b). According to this series of surveys, the growth of value added by small-scale enterprises in rural Kenya averaged 17 percent per year during the period 1973 to 1982, and the number of establishments grew by 39 percent per year. These figures may represent an overestimate of the growth, since it is possible that the coverage of the survey has increased over time. In any case, there is considerable additional evidence that the growth has been substantial. For rural Kenya, the consumption linkage is somewhat more powerful than the production linkages in generating nonfarm rural production (Herr 1989). Much of the activity is directly related to farm output, with about 38 percent of total employment in the rural trading centers in food retailing and another few percent in food milling activities. These links could be described as forward linkages from agriculture. Backward linkages, such as the retailing of fertilizers, were not significant.

2. To some extent, this may be biased upward by the underrecording of rural manufacturing.

Together, the forward- and backward-linked activities probably represented 45 percent of the total activities, while the remaining 55 percent could be classified as being linked to consumer demand.

Another study of the rural informal sector in four districts concluded that the type of activities found in the rural areas are similar to those found in the major urban centers (Ngethe, Wahome, and Ndua 1989). The manufacturing sector only made up about 15 percent of the sample, while trade and services made up the remaining 85 percent.

Small-scale rural manufacturing appears to be locally oriented for the most part, with few links beyond this area (Williams and Kabagambe 1982). If this is correct, the present rural nonagricultural sector can only benefit from local expansion. It seems, for example, that the secondary impact of the coffee boom was concentrated in the major coffee growing regions and the urban economy, whereas other rural areas benefited little from this apparently national economic expansion.

Early growth in Kenya was concentrated in large-scale agriculture, plus modern secondary and tertiary activities, and it was located in those regions or urban centers with a favorable infrastructural position. In recent decades, smallholder agriculture has expanded rapidly, but this has been primarily in the regions close to the core areas. Strong cumulative or agglomerative forces favoring continued growth in the centrally located regions therefore persisted. It seems that agricultural development is more easily achieved in densely populated areas.

Apart from infrastructure, which is the result of policy decisions, several endogenous economic forces explain the spatial pattern of growth. In this analysis it is useful to distinguish between economies of scale that are internal to firms and external agglomeration economies. The latter category contains input-output linkages and interactions between final demand and producers. There are three kinds of industries, as defined by locational determinants. First, there are the resource-oriented industries such as agriculture. They have to locate where the resource (e.g., agricultural land) is located. Agriculture is thus by its nature a widely dispersed activity. Second, in some industries economies of scale are small or distance causes considerable friction in the delivery of the final product (e.g., construction and services). The location of these industries therefore tends to reflect the distribution of the demand for their products. Finally, some industries are characterized by indivisibilities and a low distance elasticity of deliveries, such as is part of manufacturing. Their location choices are less obvious. However, the latter firms may chose a central location because of input-output linkages. Firms that exhibit a great deal of interdependence may therefore choose to locate together and thereby support each other's growth.

The supply of agricultural products as inputs to the processing industry may go either to local firms or to firms in the major urban centers. Some processing can be done locally on a small scale. It is the character of agricultural

output that determines whether agriculture can stimulate decentralized growth via output linkages.

The second factor that determines how growth impulses are transmitted is the interaction between final demand and production. In Kenya, industrial growth has been based on import substitution, that is, on the production of Western consumer goods. For industries producing consumer goods above a certain level of sophistication and for some industries producing investment goods, a very large share of the market is to be found in the urban centers. Agricultural demand for many of these goods is of secondary importance, so that the power of attraction of rural demand may not be sufficient to make manufacturing industry decentralize. As far as recorded manufacturing is concerned, industry has not been dependent on agriculture, either as a supplier of inputs or as a purchaser of output.

As a result of the forces just described, the structure of regional production in Kenya is highly skewed. In 1976 Nairobi, with about 5 percent of the population then, accounted for 32 percent of production (Bigsten 1980). The other regions that did fairly well were Central, Rift Valley, and Coast with a per capita production between 12 and 18 percent of that of Nairobi. These all have important urban agglomerations, particularly the Coast province, which is the location of Mombasa. In Central and Rift Valley, agriculture also contributes to the favorable position. These are areas with fertile land, and they also include large-scale farms.

Modern manufacturing industry is located in the central areas (more than half in Nairobi), while Nyanza, Eastern, Western, and Northeastern regions have a very small manufacturing base. These regions all lack communication linkages and supporting services and lie outside the pull of the endogenous economic forces discussed above.

Since these regions contain both urban and rural areas (except Nairobi), some attention must also be given to the growth of the urban network. Although the rate of urbanization there has been high, it has emanated from a low base. In 1969 only 10 percent of the population were living in urban areas, half of them in Nairobi. In 1988 18 percent were living in urban centers with more than 2,000 people (there were 172 urban centers), with a third of those living in Nairobi. Nairobi has thus become less dominant in terms of urban population. Although the share of the four largest cities in the national population increased from 5.9 percent in 1962 to 9.6 percent in 1988, their share in the urban population fell significantly. At the same time, the relative importance of secondary centers increased. This growth of the smaller centers has probably increased the local integration of agricultural and nonagricultural activities.

The urban-rural distinction is blurred in Kenya (see, among others, Collier and Lal 1986; Bigsten 1988) because intrahousehold migration is extensive. The main reason for male migration is that the individual is looking for a job or taking up a job offer, and the more educated the migrant, the stronger

these reasons become. For female migrants, marriage is the dominating reason, although job search is important for those who are well educated.

According to an analysis of National Social Security Fund data (Bigsten and Collier 1980), the average period of employment in the wage sector is short. A large group of workers seem to enter employment around the age of 25 and quit after five years to return to the nonwage, presumably mainly smallholder, economy. The labor market appears to consist of two distinct behavior groups, a low-wage, high-turnover, probably manual group, and a high-wage, low-turnover, probably white-collar group. An analysis of the household budget survey (Herr 1989) tends to support this conclusion. Temporary migrants remit more than permanent migrants, which is hardly surprising since the former have retained their ties with the household and expect to return home. In 1982 temporary migrants from Central and Nyanza provinces remitted 21 percent and 17 percent of their income, respectively.

Partly as a result of migration, smallholder families are becoming dependent on off-farm sources of income. Income from own-farm production made up 57 percent of the total family income of smallholders in 1974/75 (Integrated Rural Survey), while own business accounted for 9.7 percent, wages 22.4 percent, and remittances 10.9 percent of incomes. According to the regional household budget survey of 1981/82, the share of farm-operating surplus in total smallholder incomes had declined to 48 percent, and about half of households had some wage-employment income. About 1.2 million people in the rural areas were engaged in wage employment, some in the formal sector as teachers and civil servants, and some in the informal sector or wage employment within agriculture. All these are not covered in official estimates of employment, which means that the share of labor in nonfarm employment is underestimated and the share in agriculture overestimated. There were 670,000 households engaged in self-employment. Off-farm activities among smallholder families made up about 40 percent of total working time in Central and Nyanza provinces in 1982 (Bigsten and Julin 1990).

Smallholders with very small holdings were more likely to seek off-farm work. In 1982 up to 74 percent of farmers with less than 1 acre of land worked in wage employment. They worked long hours at a low wage rate. Largeholders may exercise some selectivity in types of wage employment, while smallholders cannot. The same pattern emerges in the results from the 1982 survey in Central and Nyanza. It has been found that a high level of education leads to diversification into urban activities and thus reduces the time devoted to agriculture, but not to rural off-shamba work (Bigsten and Julin 1990). The highly educated tend to specialize more (Herr 1989, 64). Education is a differentiating factor in rural Kenya. It is noteworthy, though, that the regional household budget survey shows no correlation between the education of the head of the household and the returns to farming (Herr 1989, 161).

In conclusion, smallholder families in Kenya are now multiactivity busi-

nesses. Smallholder families diversify into other activities while retaining their base in agriculture. Migration to the urban areas is extensive, but typically the migrants return after a longer or shorter period of time. In such an economy the welfare of smallholders is also dependent on what is happening outside agriculture. They benefit from new employment and business opportunities within the rural areas, but through migration to the urban areas they may also benefit from expansion there.

Poverty

Poverty in Kenya is predominantly a rural phenomenon concentrated among the landless, pastoralists, and smallholders (table 7.5). Poverty may be measured through incomes, consumption or a food poverty line calculated in terms of the household's economic ability to achieve an adequate nutrition standard (see table 7.6). Rural poverty is most extensive in the western parts of the country. Smallholders in Central province seem to be best provided, with the lowest share of households below the poverty line.

Because of the country's high population growth, land pressure has increased, but the cities have not yet become a refuge for the rural poor to the same extent as in many other developing countries. Although there is a wide gap between mean incomes in rural and urban areas, the differentials within the areas are even wider, with those in the rural sector accounting for the largest share of income inequality in Kenya (Vandemoortele 1982). The rural household budget survey of 1981/82 showed that the share of the richest 20 percent in rural areas was 53 percent of the total incomes, that the share of the middle 40 percent was 34 percent, and that the poorest 40 percent received about 13 percent of total income.

Landownership is highly concentrated. In 1979, the 115 largest farms in

TABLE 7.5 Rural subgroups below the poverty line, 1982

Subgroup	Percentage of All within the Group
Large farmers	0
Smallholders	29
Migrants to drylands	55
Squatters	33
Migratory pastoralists	85
Sedentary pastoralists	33
Landless with good occupation	0
Landless with poor occupation	50

SOURCE: World Bank (1982).

TABLE 7.6 Estimates of smallholder poverty

Province	Percentage of Households below Poverty Line			
	Income Based 1	Consumption Based 2	Food Poverty Line 3	Food Poverty Line 4
Coast	31	44	47	47
Eastern	35	29	20	29
Central	22	18	19	33
Rift Valley	19	39	17	51
Nyanza	38	55	20	48
Western	50	52	39	52
Total	34	39	24	41

SOURCES: Collier and Lal (1980); Livingstone (1986); ILO (1983); Greer and Thorbecke (1983).
NOTE: Poor households are defined as follows: (1) Households with an annual income of less than KSh 2,000 in 1974. (2) Households with consumption expenditures of less than KSh 2,200 in 1974. (3) Households that lack resources necessary to acquire a nutritionally adequate food diet based on 70 percent maize and 30 percent beans. (4) The same as in (3) but based on observed regional diets.

Kenya had an average size of 11,630 hectares and covered 19.3 percent of arable land, while 21 percent of rural households had no land, and 25 percent had holdings smaller than 0.4 hectare (World Bank 1988). However, the connection between landownership and poverty is not as strong as might be imagined. The incidence of poverty, although somewhat higher among those with little land, does not differ markedly by holding size (ILO 1983).

One problem in evaluating the incidence of poverty is that it is difficult to measure change over time. One such attempt based on Sen's poverty index suggests that poverty in Kenya probably decreased up to the 1960s, then increased slightly up to 1969, and thereafter remained unchanged up to 1976 (Bigsten 1986). In addition, a decomposition analysis of growth up to 1976 showed that whenever the growth of smallholder agriculture per capita was positive, poverty decreased.

Beyond 1976, it appears that real wages in both private and public employment fell between the first oil shock and 1985 (World Bank 1988). Incomes in the informal sector increased up to 1979, but they also fell during the period of domestic deflation. But this assessment does not take into account the impact of changes in the distribution of labor force among activities; it just considers changes over time in real income within categories. A comparison of the rural surveys of 1974/75 and 1981/82 suggests that smallholder family incomes increased over this period. The latter conclusion is supported when the budget share of food is used as an indicator of welfare, on the assumption that this will fall as households grow more prosperous (Herr 1989). A comparison of the integrated rural survey of 1974/75 and the 1981/82 rural household budget

survey indicates that between these two periods there was a reduction in the overall budget share for food (Herr 1989, 23, 51). This suggests that the welfare of smallholder families improved over this period.

If these estimates are accepted, it seems that both the urban-rural gap and the formal-informal sector gap declined somewhat from the mid-1970s to the mid-1980s. Thus the income distribution within the group of workers and smallholders may have become more even. Whether poverty decreased is not easy to say.

As for income distribution between wage earners, various farmers, and profit receivers, the owners of large farms probably fared better than smallholders between 1979 and 1986 (Bigsten and Ndungu 1992). During the 1980s, the cash crop producers had smaller price increases than food crop producers. Since most of these producers are better off, it is possible that the poorest farmers benefited from this situation. As already pointed out, however, Kenya's smallholder families also live on income other than that from their own farms, and the poorest tend to be net purchasers of food. The level of wage employment has increased substantially since 1979, while wages have fallen. Modern sector agricultural employment, which is particularly important to smallholder families, actually fell up to 1983. Since then it has increased again to a level above that in 1979. The income gain from formal employment must therefore have been limited. The rapid expansion of informal rural activities may have been the factor that helped rural families protect their income levels. The evidence on this is as yet fragmentary, however.

To summarize, there have been offsetting influences on income distribution. On one hand, narrowing gaps between urban and rural areas and between formal and informal employment are likely to have reduced inequality. On the other hand, capital and landowners (other than smallholders) seem to have done better than employees and smallholders. At present, it is not possible to say in what direction inequality may have changed.

A Reassessment of Linkages

The sustained growth experienced by Kenya has clearly been above the African average in both agriculture and other sectors. What the country's pro-agricultural policies contributed to this growth through linkages is not quite as clear.

An examination of the two major agricultural shocks reveals powerful pecuniary multiplier effects, but only a weak real multiplier. The origin of the identified real multiplier effect was a labor market distortion: during the 1960s and 1970s urban wages tended to be well above the supply price of labor from rural areas, although the gap was narrowing. As of the mid-1970s, this gave rise to a multiplier of 1.2, according to CGE results: that is, an increase in agricultural income of K£ 1 would raise output elsewhere in the economy by K£

0.2. However, the rural-urban gap probably continued to narrow through the 1980s, and in response to this restoration of allocative efficiency the real multiplier must have diminished.

The pecuniary multiplier traveled along three distinct paths, the predominant one being the impact on the construction sector. During the coffee boom, there was a construction boom; during the drought, there was a construction slump. This hypothesis is supported by the time-series econometric approach adopted in this study. Although no evidence was found to substantiate a link from agricultural growth to manufacturing or consumer nontradable services, there was a large and statistically significant link between agriculture and the construction sector. A further test established that causality ran from agriculture to construction. This link has perhaps received little attention in the literature in comparison with the more glamorous hypothesized link between agriculture and manufacturing. As an intrinsically nontradable sector, however, construction is more likely to experience a powerful pecuniary multiplier than manufacturing (which is either fully tradable or subject to endogenous trade restrictions). Furthermore, if the major real multiplier works through the labor market distortion (as suggested in this chapter), then it is likely to generate a larger real multiplier than an equivalent expansion in manufacturing output, for although subject to the same wage rate restrictions, it is usually more labor intensive.

The locational aspects of linkages in Kenya throw some further light on the agriculture-industry relationship. Although much of industry needs to be in a centrally located agglomeration, some is located in rural areas. A good many of these rural industries were producing output that was nontradable outside the locality and hence, a fortiori, nontradable internationally. Thus these rural industries have economic characteristics which would indeed make them more analogous to construction than to large-scale urban manufacturing (the activity that dominates manufacturing in the national accounts).

The general proposition that tentatively emerges from this analysis is that agricultural performance is likely to give rise to powerful transfers (i.e., pecuniary multipliers) to those nontradable activities in which demand is particularly sensitive to agricultural incomes. Rural industries qualify as such activities if they produce for the local market. Construction is such an activity because agricultural income fluctuates more than other components of national income and so is decisive in savings fluctuations, which are in turn transmitted to nontradable capital goods. In Kenya, as well as much of Africa, large-scale manufacturing is not such an activity because, although protected, that protection varies pro-cyclically with agriculture (since the function of protection is primarily to respond to macroeconomic considerations rather than to act as an instrument of industrial policy). In India, where manufacturing receives virtually blanket protection as a matter of industrial policy, it might be expected to be more sensitive to agricultural performance, but such a speculation is beyond the scope of this discussion.

Pecuniary multipliers are good news for the sectors that benefit from them, but, being transfers, they net out in aggregate growth. The central issue is whether agricultural growth generates a real multiplier. Although there is some evidence for such a multiplier in Kenya, all such effects have originated in either a distortion or failure in some other market such as those for labor and credit, or in agricultural technical progress. Kenya's labor and credit markets have been sufficiently distorted for a substantial multiplier to have been credible. Although they persist, a pro-agriculture policy can be supported on efficiency as well as equity grounds. But a case can also be made for directing policy toward improving the functioning of markets. As such policies succeed, the real multiplier will wither, unless technical progress accelerates, and leave the pecuniary multiplier: in other words, a "trickle down" will replace a "free lunch."

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