

## **The Lewis Model and the Diverging Development Paths of Asia and Africa**

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### **1. Introduction**

In this paper we undertake a comparative study of the development paths of Asia and sub-Saharan Africa since the 1960s applying the classical framework used by Arthur Lewis in his 1954 paper on economic development with unlimited supplies of labour. We argue that the classical framework used by Lewis can provide powerful insights into the comparative development trajectories in the two continents with useful policy lessons – much of which has been lost to the literature that has evolved on this subject since the 1980s. As pointed out by Lewis, with the assumption of unlimited supply of labour in the classical system, attention is focused on enquiring how the system expands over time, with income distribution, capital accumulation and growth taking the centre stage, and relative prices of commodities determined as a by product. With the ascendancy of neo-classical thought in development economics since the 1980s, however, debates on relative prices in relation to market efficiency have taken the centre stage, and capital accumulation and the expansion of the system have become minor by products believed to be brought about by the working of efficient markets. This has also significantly influenced the recent literature on comparative growth of Asia and Africa.

In the next section we begin by a brief overview of the recent literature on comparative development of Asia and Africa. We argue that much of this literature has been preoccupied with identifying government policy differences as the main explanatory factors, in particular with reference to market distortion effects of policy interventions, to the neglect of the differences in economic structures between the two regions which shape government policies and influence their outcomes. It is in relation to these structural differences that the classical framework of the Lewis model can act as a powerful analytical tool. Since the key concept in the Lewis model is that of surplus labour, in Section 3 we compare Asia and Africa in terms of their proximity to the surplus labour economy depicted by Lewis. We show that although Asia seems to fit the surplus labour economy model, both in terms of its structures and development patterns, the sub-Saharan African economies in the wake of their independence were by and large labour constrained economies. Given that the major part of the population in both regions in the 1960s lived in rural areas and was engaged in agricultural and related activities, we argue that the key factors affecting surplus labour conditions in the two regions emanated from the production conditions in agriculture. The implications of the differences between the agrarian systems in the two regions, in terms of development patterns and policy options are discussed in the following three sections. In Section 4 we discuss the development options and

policy constraints in sub-Saharan African type economies with limited supply of labour, with particular reference to agricultural transformation and development of infrastructure. The implications for the apparent extreme duality of the sub-Saharan African economies and the urban bias hypothesis are discussed in Section 5. In Section 6 we discuss the implications for financing of accumulation, and concluding remarks are made in Section 7.

## **2. Recent Debates on Comparative Growth of Asia and Africa**

The recent literature on comparative development of Asia and Africa has been dominated by debates on structural adjustment policies by the World Bank and its critics. As a result, the main focus of much of the literature has been on policy differences between the two regions and their supposed implications. The early studies of the success of Asian industrialization by the World Bank were aimed at drawing lessons from the Asian experience, which normally took the form of highlighting the virtues of free markets, liberalized trade regimes and state non-intervention in economic development. This later took the form of prescriptive advice for the African economic malaise which was said to have been caused by pursuing interventionist policies contrary to neo-classical notions of market efficiency and policies highlighted in the World Bank studies of the Asian experience (see, e.g. World Bank 1981a, 1981b, and Meier and Steel, 1987). Much of the literature which developed in this period as a critique of the World Bank position was concerned with demonstrating that the experience of the Asian miracle economies was indeed far from the non-interventionist approach highlighted in the World Bank studies (see, e.g., Amsden 1989 and Wade 1990). As yet little attention was paid to the question of the conditions of possibility of transferring development strategies and policies from one country to another, let alone the possibility for such a transfer at the continental level.

More recent work seems to be taking the question of 'reproducibility' of country experiences more seriously. For example, the World Bank's realization that economic policies, notwithstanding their intrinsic merits, will not be effective if they are not 'owned' by the country in question is a belated recognition of the 'reproducibility' question. Others have addressed the issue of reproducibility of policies in the specific context of the Asian and African development experiences (see, e.g., Stein 1995, Laurence and Thirtle 2001). For example, Stein (1995a) identifies a number of factors that, according to the findings of the studies in his edited volume, complicate the implementation of the Asian type industrialization policies in Africa – e.g. the absence of appropriate political alliances and structures of governance, backward social and economic infrastructure, absence of appropriate cultural and social norms, etc.

In this paper we argue that the separation of the issue of identification of policies pursued in Asia and the question of reproducibility of such policies in the context of Africa is not illuminating and can result in superficial and misleading policy conclusions. To begin with, we note that politics in general and economic policy in particular are country specific issues and are best analysed in the context of individual countries or comparisons of countries with similar economic structures, rather than continent or region wide comparisons. It would be implausible to assume that most countries in one region have adopted the right policies and those in the other region adopted the wrong policies simply because of their geographical location. In order to explain general tendencies at the regional level it would be perhaps more plausible to start from the shared structural features of the economies in question rather than making overgeneralizations about political tendencies and policy choices at a regional level. And it is with regard to such shared structural features of the economies in the two continents that the Lewis model acts as a powerful tool of analysis. Since surplus labour is the central element of the Lewis model, we may start by asking to what extent the Asian and African economies have exhibited traits which conform with the surplus labour hypothesis.

### **3. Agrarian Structures in Asia and Africa and the Surplus Labour Hypothesis**

According to Lewis (1954), the condition of unlimited supply of labour does not necessarily apply to all the developing countries. He explicitly pointed out that a large part of Africa and Latin America did not seem to fulfil this condition. As a general regional attribute he only referred to Asia as characterized by surplus labour, and Egypt was the only country in the African continent which he explicitly mentioned as an economy with possibly unlimited supplies of labour. With historical hindsight we can now use the data on economic development in Asia and Africa over the few decades since the 1960s to examine how closely these countries follow the surplus labour model.

Since the publication of Lewis's paper, a large body of theoretical and empirical literature has appeared on the microeconomic underpinnings of the surplus labour hypothesis. As our main focus in this paper is on broad comparative regional indicators, we shall not delve into the definitional intricacies of the microeconomic debate. Instead we introduce a concept of surplus labour economy which retains the essence of the Lewis model and at the same time can be made operational for the purpose of cross country comparisons. Our definition of surplus labour also somewhat diverges from Lewis's definition in being more in line with the concept of reserve army of labour of the classical political economists than the product-sharing concept used by Lewis.<sup>1</sup> For our purposes a surplus labour economy is defined as one where a major

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<sup>1</sup> In other words, we assume any product sharing which may be necessary for the upkeep of the surplus labour is done at the level of household or community as consumption units, rather than as production units as assumed by Lewis.

part of the labour force with little or no access to means of production, particularly land, is engaged in low productivity jobs, mainly taking the form of casual wage labour, and is prepared to offer its labour services for relatively low wages close to subsistence levels. This reserve army of labour is large, and reproduces itself at a sufficient rate such that it can provide an elastic supply of wage labour to a rapidly growing high productivity capitalist sector for a long span of time. With the growth of the high productivity, modern capitalist sector, the overall productivity of labour in the economy increases, but because of the surplus labour condition the product wages in the capitalist sector remain fixed or increase at much lower rates than the rate of productivity growth of the newly employed labour. This forms the basis for an increasing savings surplus in the form of profits in the capitalist sector, which can fuel capital accumulation and self sustained expansion of the economy. There are other details such as sectoral balances and necessary structural changes along this process which can be discussed in the context of concrete empirical experiences of countries in the following sections.

The history of sub-Saharan Africa and the Americas during the colonial times, where one of the defining characteristics of colonial policy was to deal with labour shortages, shows how far these two continents were in those days from the surplus labour paradigm sketched above (see, e.g., Paulin 2001, Fall 2002). Our concern here, however, is to assess the surplus labour condition in Asia and sub-Saharan Africa during the more recent past. For this purpose we compare twenty-eight countries in sub-Saharan Africa with ten countries in Asia since the 1960s, which is the earliest decade in the post-colonial period where systematic data for the countries concerned are available. The countries included in this study, listed in Table 1, comprise the majority of the population in the two continents. As Table 1 shows, in the mid-1960s Asian countries were on average more industrialized than sub-Saharan Africa, as indicated by their respective shares of employment in the industrial and services sectors. However, in both regions over 80 per cent of the population in the mid-1960s were still in the rural sector, mostly engaged in agricultural activities. There are of course exceptions in both continents, e.g., South Africa in sub-Saharan Africa and to some extent Korea in Asia, where both countries exhibit more advanced employment structures than the regional averages. We shall show particular attention to such exceptions as we proceed, because they show the possible future trajectories of development in their respective continents. But the concentration of employment in the rural areas and predominantly in agricultural activities in both regions in the early 1960s clearly indicates that the conditions of the existence of surplus labour in both regions should be investigated first and foremost in relation to the characteristics of their respective agrarian systems.

An important contrast between the Asian and the Sub-Saharan African agriculture is the much higher population pressure on land in Asia as compared to Africa. This is reflected in the data in the first two columns of Table 2, which show labour/land ratios in Sub-Saharan Africa and Asia for 1965 and 1994. As can be seen, the number of labourers per hectare of agricultural

land was on average five times higher in Asia than in Sub-Saharan Africa in 1965. This of course does not mean that the agricultural population in Africa are uniformly spread across wide tracts of agricultural land. As can be seen in the third column of the table, on average only about 16 per cent of the agricultural land in the sample countries in Sub-Saharan Africa in the mid-1960s is cultivated land. The rest is composed of pastures which is partly used for herding and hunting gathering, and partly unutilized. This does not mean that all or even most of the remaining pastures are readily cultivable, or suitable for cultivation at all<sup>2</sup>. The figures nevertheless help to delineate the difference in the predominant systems of farming in the two regions; namely, extensive farming in Sub-Saharan Africa where smallholder agriculture is based on shifting cultivation and where the main constraint to output expansion is labour and labour augmenting technological possibilities, and intensive farming in Asia where land, and land augmenting technological possibilities form the main constraints to growth. This is further reflected in the patterns of investment and input use in the agricultural sectors in the two continents.

In Asia, where most countries had already reached the limits of agricultural land frontiers in the 1960s, and with enormous population pressure on land, agricultural growth has been based on land augmenting but labour intensive seed/fertilizer technology of the green revolution and multiple cropping methods. This is reflected in high rates of fertilizer use and irrigation in Asia in contrast to Sub-Saharan Africa, as shown in Table 3. As can be seen, already in 1965 average irrigation rate in Asia was fifty times higher, and fertilizer use was more than ten times higher than in Sub-Saharan Africa. Tractor use, which is a relatively more labour saving than land augmenting device, was on the other hand more or less at par between the two regions in 1965. These input-use ratios, of course, should not be viewed as fixed technological coefficients appropriate to given systems of farming. There is for example no reason why extensive farming cannot benefit from higher fertilizer use, or irrigation, which can increase productivity of both land and labour. The example of extensive farming in the highly capitalized South African agriculture with much higher fertilizer use than African average is a case in point (Table 3). The low input use ratios for Sub-Saharan Africa are therefore also indications of low investment and undercapitalization of agriculture in the region. This is highlighted by the rapidly widening gap in input use (whether of the seed/fertilizer type or tractors and machinery) between Asia and Africa during the 1965-94 period (Table 3), which also explains the significant differences in agricultural labour productivity growth rates between the two regions which will be discussed below. Of course, investment growth in agriculture itself depends, amongst other things, on the availability of new productive technologies which can help maintain the profitability of investment in the sector.

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<sup>2</sup> For a detailed discussion of the various degrees of suitability of agricultural land for cultivation in different Sub-Saharan African countries see, FAO, 1986.

The above picture is in conformity with the basic stylized facts about the technological level of Sub-Saharan African agriculture discussed in the literature, namely that with a few exceptions it predominantly consists of subsistence farmers using simple technologies and with little use of modern inputs. It would be, however, wrong to conclude on this basis that the level of labour productivity in the post-colonial Sub-Saharan African agriculture was much lower than in Asia. It would be certainly plausible to assume that land productivity in extensive agriculture of Sub-Saharan African type would be lower than intensive farming in Asia, but the same does not hold for labour productivity because lower yields can be compensated by higher land/labour ratios. This was indeed the case, as can be seen from Table 4 which shows land and labour productivity in the sample countries in Sub-Saharan Africa and Asia in comparable (wheat equivalent) units. As shown in the table, in 1965 median land productivity in Asia was eight times higher than the median for Sub-Saharan Africa, but labour productivity levels in the two regions were not significantly different. In fact labour productivity levels in most African countries in 1965 were higher than the least developed countries in Asia such as Bangladesh, China, India, and Indonesia. Of course in the subsequent period, with the much higher rates of productivity growth in Asia, the labour productivity gap between the two regions widens rapidly (Table 4).

Some of the other differences in the agricultural systems in Asia and Africa are also related to their differences in population pressure on land. A fundamental aspect of such differences in the two agricultural systems pertains to the prevailing relations of production, namely, the patterns of ownership and control of land and other productive assets, and organization of labour, in the two regions. Asian agriculture, given its high population density, by and large consists of highly differentiated peasant ownership structures, with a large part of the agricultural labour force taking the form of landless labourers or poor peasant farmers with the major part of their livelihood taking the form of wage income. Rural wages in these economies are well below the average product of labour. The post-colonial land abundant Sub-Saharan economies on the other hand have more limited development of wage labour in agricultural production. Possession of agricultural land by individual farmers has been predominantly through some kind of communal arrangement or traditional customary rights, with family labour being the predominant form of agricultural labour. The lack of development of wage labour has been due to the ease of access to the main productive asset in agriculture, namely land.

Though other derivative institutional aspects of Sub-Saharan African agriculture, such as lack of development of financial markets, obviously have important implications for the development of these economies, the absence of a landless wage labouring class is of fundamental importance to the surplus labour hypothesis<sup>3</sup>. In Asia, the non-agricultural sectors

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<sup>3</sup> The above characterization of predominant agrarian relations in Sub-Saharan Africa is based on Binswanger and McIntire, 1987, and Hayami and Platteau 1997. This is of course an oversimplified stylized picture which does not apply to all parts of Sub-Sahara or even to all parts of any individual country in the region. The picture has been also changing very rapidly with

have had access to an abundant supply of wage labour at wage rates which are a fraction of the average product of labour in agriculture, and with relatively elastic supply. In Sub-Saharan Africa on the other hand, the opportunity cost of labour or the reservation wage for the non-agricultural sector is close to the average product of labour in agriculture. This is because under the institutional arrangements of Sub-Saharan African agriculture the individual farmer appropriates the total product and the rental market for agricultural land is undeveloped<sup>4</sup>. This can imply a substantial differential in the two regions in non-agricultural wages relative to average productivity in agriculture.

Before looking at the actual wage differences between the two regions, it would be helpful to form some approximate idea about the orders of magnitude of implied wage differences involved. According to estimates by Mellor and Ranade quoted in Delgado and Ranade (1987), the share of labour in agriculture in Maharashtra (India) was 15 per cent. Of course there are variations in factor shares across different regions in India, as there are across different countries in Asia<sup>5</sup>. But even if we assume a labour share as high as 50 per cent on average in Asian agriculture, and also considering that average labour productivities in the agricultural sectors in the two regions in 1965 were more or less equal, the above argument implies a non-agricultural wage rate in Sub-Saharan Africa which is at least 100 per cent higher than Asia. With a less conservative, but perhaps more realistic, assumption of wage rates in Asian surplus labour agriculture being 30 per cent of the average product of labour, and in Africa 90 per cent, the reservation wages for African non-agricultural sector would be 3 times higher than Asia in 1965. These are of course very inexact estimates, but they nevertheless provide an idea of the plausible ranges of the orders of magnitude involved. It would be instructive to compare these with some of the available evidence on wage differentials between Asia and Sub-Saharan Africa.

Table 5 shows wages in manufacturing sector in our sample countries in Asia and Africa. Wage rates are calculated as total compensation of labour divided by the number of workers. The first broad column in the table shows wage rates in US dollars converted at official exchange rates. As can be seen, during the latter half of the 1960s, wages in Sub-Saharan countries for which data are available, were on average more than 90 per cent higher than in

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fast rates of population growth. However, as a stylized characterization of Sub-Saharan smallholder agriculture in the immediate post-colonial period, and in contrast to Asian agriculture, this may be a permissible generalization.

<sup>4</sup> There is of course an implicit rental value, for example when the remaining members of the family keep working on the land when the head of the household migrates. When land is relatively abundant, however, the marginal product of the migrant worker is likely to be close to average product of labour. This is in fact supported by the available evidence in the case of Sub-Saharan Africa. According to the evidence reviewed in Delgado and Ranade (1987), the marginal product of labour in Sub-Saharan Africa seems to be very close to the average product, in contrast to Asia where marginal product of labour is well below average product. The same is also suggested by Delgado and Mellor (1984, p.667), who believe that the output elasticity with respect to labour in Sub-Saharan Africa is close to 1. My own estimates, based on a cross-section estimation of production function for 1965 using the data in Tables 3 and 4, also confirmed these points. A linear production function shows output elasticity, evaluated at mean, of 1.05, and a log-linear function gives estimates of 0.86.

<sup>5</sup> Maharashtra in fact has one of the lowest population land ratios amongst Indian states. As shown in Table 14, India's labour/land ratio is close to the median in Asia.

Asia. Despite the considerable variations within regions, the average for Africa is significantly more than Asia. During the 1970s the wage gap between the two regions widens considerably before it narrows down sharply in the 1980s. These figures, evaluated at official exchange rates, are not of course appropriate indicators of the variations of wages in real purchasing power terms across countries, or over time<sup>6</sup>. The second broad column of the table shows consumption wages in international purchasing power terms in different countries. When valued in purchasing power parity terms the median wage gap between the two regions during the 1970s considerably narrows down to the same order of magnitude as in the 1965-70 period, and by the late 1980s the wage gap almost vanishes. While comparable across the countries, these figures are not appropriate indicators of real wage changes over time. The third broad column of Table 5 shows the real wage indices (deflated by domestic consumer price index), which indicate the movement of real wages in different sample countries over time. As can be seen, wage increases in Africa during the 1970s were not on average different from those of Asia, and during the 1980s recession real wages in Africa witnessed a precipitous decline.

These wage differentials, which are in line with other evidence on wages in Sub-Saharan Africa, highlight a number of important points<sup>7</sup>. Firstly, the average wage differentials in the 1960s were not higher than the expected ranges derived from a priori reasoning above, based on the agrarian structures agricultural productivities in the two regions. Secondly, the 1960s wage differentials and the movement of wages in the subsequent period do not support the commonly held view that the power of labour unions or urban interest groups were the main reasons for wage differential between the two regions. In fact real wages in the recessionary period of the 1980s in Sub-Saharan Africa have shown remarkable flexibility<sup>8</sup>. Wage rates in sub-Saharan Africa moved relatively in line with the overall per worker GDP during the growth period up to the early 1980s, but showed a sharp decline both in absolute terms and relative to per worker GDP during the recessionary period of the 1980s. The rapid decline in real wages and their falling behind the growth of GDP per worker from the inception of the recession does not seem to be in line with the urban interest group theory, but it is very much in tune with the labour shortage hypothesis suggested above. Once we take into account the differences in agrarian conditions in the two regions, it appears that in order to explain the wage differentials between Asia and Africa one does not need to invoke arguments about government wage legislation or union power in the post-colonial Sub-Saharan Africa.

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<sup>6</sup> Considerable government controls, and the misalignment of the official exchange rates relative to the market exchange rates, are only part of the reasons for this. Even under free trade and free market exchange rates, relative prices across countries would systematically vary with their level of development and with the structure of their economies. In Sub-Saharan type economies for example prices are expected to be higher relative to Asian economies.

<sup>7</sup> Some of the existing evidence is briefly reviewed in Teranishi (1987).

<sup>8</sup> For a more detailed discussion of this point, using a larger sample of developing countries, see, Karshenas (1997). The behaviour of wages in Africa shows considerable flexibility compared to, for example, the behaviour of wages in Latin America during the 1980s recession.

With high rates of unemployment and underemployment of labour currently visible in urban centres in most Sub-Saharan African economies, and the fast rates of population growth which are putting increasing pressure on fragile soils in African agriculture, to refer to these economies as labour constrained economies may appear paradoxical. Labour constraints, however, are best highlighted in the context of resource requirements for sustained growth rather than the current state of employment in the crisis ridden African urban economies. This could be best seen in relation to the historical experience of growth in post-colonial Sub-Saharan Africa in comparison to surplus labour economies in Asia. One instructive comparison is the episode of rapid growth during the 1970s in Nigeria, the most populous country in Sub-Saharan Africa, with that of Indonesia in Asia. The two countries are oil-exporting economies of similar sizes, but with the difference that Indonesian agriculture has labour/land ratios which are three times that of Nigeria (see, Table 4). The prevalence of shifting cultivation which is still the predominant form of smallholder agricultural production in Nigeria, and the fact that according to available estimates cultivated land in Nigeria can be doubled with the prevailing techniques pending the availability of labour, signify the labour constrained nature of Nigerian agriculture<sup>9</sup>. It is not surprising that the oil boom of the 1970s, which led to a rapid growth of investment in Nigerian economy, induced a substantial increase in real wages in rural areas and an inflow of millions of immigrant labourers from neighbouring countries<sup>10</sup>. On the other hand, the surplus labour economy of Indonesia, throughout a long period of rapid and sustained economic growth during the 1970s and the 1980s, has shown moderate increases in real wages and has remained a net labour exporting country<sup>11</sup>.

This phenomenon can also be seen at a more general regional level, by examining the trends in real wages and GDP per worker in the two regions shown in Figure 1. The two variables are measured as simple averages of the indices of real GDP per worker and real manufacturing wages (deflated by consumer price index) for the countries in the two regions, as listed in Table 5. There are of course considerable variations in individual country experiences within each region which necessitate extra care in making generalizations on the basis of simple regional averages shown in the figure. The contrasting regional trends shown by the graphs are

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<sup>9</sup> See, e.g., Oyejide (1986) and sources quoted there.

<sup>10</sup> Rural wages in real terms increased by more than 170 per cent in Nigeria between 1970 and 1980. The exact figures for immigrant labour in Nigeria during the 1970s is not available. However, according to Adepoju (1994), it is estimated that with the collapse of the growth process in the 1980s about 1.5 million immigrant workers were expelled from Nigeria, which gives some indication of the scale of labour immigration.

<sup>11</sup> On labour migration in Indonesia and other Pacific Asian countries see, Fong (1993). A number of authors have attributed the difference in growth performance of the two countries in the post oil boom period to the differences in their macroeconomic policies and particularly their exchange rate policies. Though macroeconomic policy, in particular government expenditure policy in oil exporting countries is of utmost importance, in labour constrained economies such as Nigeria the real exchange rate becomes endogenous once government expenditure policy is given. The rise in real wages and the apparent overvaluation of the real exchange rate in such economies is an inevitable result of the investment boom in the face of labour shortages. This is not necessarily the case in surplus labour economies such as Indonesia.

nevertheless representative of the experience of many, if not all, the countries in the two respective regions.

As can be seen from the top graph, in Sub-Saharan Africa during the growth period of 1965-80 real wages grow more or less in line with the growth of labour productivity, and it is only during the slowdown of the 1980s and the deep recession in the non-agricultural urban economy that wages fall behind GDP per worker trends. In Asia on the other hand productivity growth surges ahead of real wage growth throughout a long period of rapid and sustained economic growth. The behaviour of real wage/productivity trends in Asia has a remarkable similarity to the trends envisioned by the surplus labour economy model of Lewis (1954). The existence of surplus labour in Asian agriculture has been part of the reason for the possibility of generation of the wage/productivity trends seen in Figure 1. The other part has been the ability of agriculture, through investment and a constant introduction of new technologies, to provide cheap food and raw materials necessary for the growth of employment in other sectors and for the feeding of a growing population in general. Without this latter condition being met, the growth of employment, output, and productivity in the economy would be choked in early stages by increasing food prices and erosion of investable surpluses in the rest of the economy. The African wage/productivity path during its growth period of 1965-80, shown in the graph, is due to the fact that one or the other, and in the majority of cases both, of these conditions failed to be met in a large part of that continent.

The fact that the reservation wage in non-agricultural sector in post-colonial Sub-Saharan Africa was close to the average product of labour in agriculture, at the same time meant that the transfer of labour from agriculture would lead to a decline in agricultural output more or less equivalent to the reservation wage of the transferred labourer. This is of course due to the institutional and technological characteristics of Sub-Saharan agriculture, which, to begin with, we may assume as given. A large scale investment effort, as was certainly needed and also envisaged in the post-colonial euphoria in Sub-Saharan Africa, would under such conditions lead to large increases in demand for food outside agriculture while, at least in the short-run, the supply of food would be constrained because of the shift of labour out of agriculture. Under these circumstances, whether by government design or under the operation of market forces, the rising demand for agricultural output for domestic use would undermine the profitability of cash crop exports and would shift the composition of agricultural output towards domestically consumed goods. Wages and prices of domestically consumed agricultural products would increase relative to the prices of export cash crops and non-agricultural products. This is not of course a sustainable process. But to the extent that the country can rely on external loans to cover the balance of payments gap, the government may be able to maintain the investment process by bolstering profit margins in non-agricultural activities through cheapening the labour cost by food subsidies. To the extent that such policies lead to further increase in demand for labour outside agriculture, it could further lead

to a contraction of agriculture (or a slow down in its growth in an economy with population growth), particularly of the agricultural export sector. In this type of labour constrained growth process, real wage increases relative to labour productivity growth would be inevitably much higher than in the Asian type surplus labour economies. The build-up of foreign debt would, however, bring this type of growth process sooner or later to an end.

#### **4. Development Constraints in Economies with Limited Supply of Labour**

The above scenario of growth process in labour constrained economies, however, is by no means inevitable. The above chain of reasoning started with the key assumption that the technology of production in the agricultural sector was given. However, with the possibility of introducing labour saving technologies which can continuously increase the productivity of labour in agriculture as labour increasingly moves to the non-agricultural sectors, there is no reason why the Sub-Saharan type economies could not follow similar growth processes as the surplus labour Asian economies. Apart from the nature of their resource availabilities and factor proportions, therefore, the possibilities of introducing labour saving technological change in agriculture should be considered an important part of the definition of, and growth prospects in, labour constrained economies.

There are those who believe price distortions as the main cause of African agricultural underdevelopment. Such beliefs are critically based on the assume that endogenous technological change under the pressure of market forces and given the right price signals would have automatically taken care of the necessary technological transformations. They would argue that for example in the above discussed scenario of growth, rising non-agricultural product wages and relative prices of domestically consumed agricultural products would induce greater investment in agriculture and greater utilization of labour saving technologies in the sector. The fact that this did not take place in Sub-Saharan Africa is argued to be because of the price distortions introduced by government food subsidies and protection of non-agricultural sectors. This argument, however, ignores some of the important structural features of Sub-Saharan African agriculture, which could either weaken the transmission of price signals or may limit the ability of the producers to respond to the price signals in the desired manner. Predominant amongst such structural impediments, as emphasized by most specialists of African agriculture, are the backward state of infrastructure which introduce prohibitive transaction costs for a large segment of small peasant food producers in the region, and the lack of ready availability of new technologies of production suitable to the soil and climatic conditions in Sub-Saharan Africa and at the same time adaptable to the conditions of small food producers in the region.

The poor state of Sub-Saharan African infrastructure relative to Asia has been extensively discussed in the literature (see, e.g., Ahmed and Rustagi, 1984, Riverson, *et al.*, 1991, Ahmed and Donovan, 1992, Spencer, 1994, World Bank, 1996, Hayami and Platteau, 1997, and Terranishi, 1997). The low population densities in most Sub-Saharan African countries and the dispersion of rural population over vast expanses of land are argued to have led to a low density of road networks and other communication links (Hayami and Platteau, 1997). As can be seen from Table 6, population density in Asia is on average about 9 times higher than the median for Sub-Saharan African countries in our sample. There are of course wide variations in population densities across the countries in the two regions, and Nigeria, the most populous country in Africa, has population densities close to or above countries such as China, Indonesia and Malaysia in Asia. Table 6 also shows road densities in the two continents, which gives some indication of the backward state of transport facilities in Africa relative to Asia. The overall road densities indicate median figures for Asia which are double those of Sub-Saharan Africa. Most of the roads in Sub-Saharan Africa are, however, unpaved and not suitable for motorized transport. As shown in Table 6, the density of paved roads in Asia in 1970 was on average nine times higher than Sub-Saharan Africa. Though during the 1970s the gap was somewhat reduced, during the crisis decade of the 1980s road construction in Sub-Saharan Africa showed a noticeable slowdown, and by 1990 the gap in paved road density between the two continents once again widened to the same order of magnitude as in the early 1970s (Table 6). A more or less similar situation existed in terms of rail and water transport between the two continents (see, Ahmed and Donovan, 1992).

The overall road density figures, however, do not reflect the extent to which the existing roads benefit rural areas. The available evidence shows that in fact the rural transport links in Sub-Saharan Africa are even weaker than suggested by the road density figures shown in Table 16. For example according to the study by Riverson, *et al.* (1991), in Nigeria, one of the countries in Africa which according to the data in Table 16 has much better than average road networks, rural road density was in fact one eighth of density in rural regions in India with similar population densities (see, also Spencer, 1994). Once one takes into account the quality of the roads and means of transport, the gap between Sub-Saharan Africa and Asia will be further widened. This picture is repeated with perhaps even more intensity with respect to other infrastructural facilities such as electricity, telecommunications, health and sanitation etc. For example, Ahmed and Donovan (1992, p.5), comparing seven countries in Africa with five countries in Asia note; in Africa 'only 3-5 per cent of villages in some countries have any electrification ... In contrast, in Asian countries roughly 50 percent of villages have electricity'.

The poor state of infrastructure in rural Sub-Saharan Africa and the dispersion of rural population across vast expanses of land of course implies much higher cost of transport and

trade than in Asia<sup>12</sup>. In a study of nine Asian and African countries, for example, Ahmed and Rustagi (1984) found much higher marketing margins in Africa as compared to Asia, and even a larger gap in regional price differentials in the two regions indicating a low degree of market integration in African countries<sup>13</sup>. The decomposition of the marketing margins in this study showed that close to 40 per cent of the gap between Africa and Asia was due to higher transport and storage costs. Of the remaining 60 per cent, about a half, 33 per cent, was due to higher taxation and profits, and the residual 27 per cent is attributed by Ahmed and Rustagi to inefficiencies arising from the operations of marketing boards. The high transaction costs resulting in the first place from the lack of development of infrastructure have substantially reduced the tradability of agricultural products for the larger part of the small producers in Sub-Saharan Africa, and as far as international trade is concerned transaction costs for the majority of small producers not in the vicinity of major ports have been prohibitive. According to Delgado (1997, p.156), this 'semi-open' character of Sub-Saharan African agriculture is because 'transport and other marketing costs for the bulky items in which they trade -- including food staples and major exportables -- end up doubling and tripling the price of exportables at the African dockside (f.o.b. price) relative to their price at the farm gate; a similar price rise occurs for importables between their delivery to an African port (c.i.f. price) and the point of consumption'. This view which is shared by many other analysts of African agriculture (e.g., Koester, 1986, Jaeger, 1992, Jayne and Jones, 1997), partly explains the lack of response of agricultural prices and output to trade flows and to the movements of real exchange rate (see, e.g., Teranishi, 1997).

The second and related structural problem facing the post-colonial Sub-Saharan African agriculture pertained to the technological conditions of production and the possibilities of technological change. The post-colonial countries in Africa faced two distinct possible technological trajectories; one exemplified by the South African path, and the other by the intensive smallholder farming in Asia. The South African path, consisted of a technological set up based on large scale, extensive commercial farming with a high degree of substitution of capital for labour. South Africa's agricultural system, with one of the lowest labour/land ratios in Africa, and with yields which were no more than average for Africa, has attained one of the highest labour productivity rates amongst the African or Asian countries (Table 4). This system, however, was neither politically viable nor economically affordable for the rest of post-colonial Sub-Saharan African economies, nor was it advisable under the prevailing

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<sup>12</sup> Weak transport infrastructure is not the only reason for high transportation costs. Other infrastructural weaknesses can also play an important role. For example, as noted by Ahmed and Rustagi, the lack of electrification of rural Sub-Saharan Africa meant that bulky unmilled products had to be transported long distances to the milling centers which substantially added to transport costs.

<sup>13</sup> According to Ahmed and Rustagi (1984), the average producer price expressed as a percentage of the terminal market price ranged between 75 to 90 per cent in Asian countries, while the comparable figure for African countries was 35 to 60 percent. They also found that while regional price differentials in Asia corresponded to the prevailing trade and transport margins, in the case of Africa regional price differentials were even larger than that warranted by the higher trade and transport margins, indicating lack of market integration in Africa.

infrastructural conditions in Africa. To concentrate scarce capital on extensive commercial farms with low employment generating potential would have left the majority of the population which were small agricultural producers in a state of perpetual underdevelopment. Though there has been some debate on the appropriateness of large scale extensive farming versus intensive peasant farming in the post-colonial Sub-Saharan Africa, specially in relation to Eastern and Southern African agriculture, the main thrust of policy has come to be settled by and large on the intensive farming, small producer Asian path as the only viable alternative in Africa (see, Mellor, Delgado and Blackie, 1987a).

The emulation of the Asian type intensive farming, however, in addition to investment requirements for the development of economic infrastructure such as transport, power, and irrigation, as well as new inputs such as fertilizers, seeds, and pesticides, also required substantial new investments in research and extension services. The agro-climatic conditions in Sub-Saharan African agriculture, which were different from Asia and at the same time highly varied across different sub-regions in Africa, meant that a simple transplantation of the seed/fertilizer technology of the Asian green revolution without basic new research and development was impractical<sup>14</sup>. Without the development of appropriate new technological packages which could ensure adequate returns as well as stability of income for small farmers, other public investments in agricultural infrastructure would have remained by and large ineffective.

As in the case of Asia, therefore, the development of small producer, intensive farming in Sub-Saharan Africa required a substantial gross inflow of new inputs in the form of both fixed investment and producer goods from outside agriculture. A major difference between the two regions, however, was the much higher investment requirements in Sub-Saharan African agriculture relative to the availability of resources. This constituted an important aspect of the structural problems of agriculture in Africa. The central institutions through which the post-colonial Sub-Saharan African countries attempted to overcome some of these structural problems were the marketing boards. Marketing boards which were inherited from the colonial times, were strengthened in the post-colonial period and used, in addition to revenue raising devices, as a mechanism for provision of subsidized inputs, and transportation and marketing outlets for the small producers which were hitherto cut off from such provisions. As pointed out by Jayne and Jones (1997, p.1521) in the context of East and Southern Africa, this 'became the cornerstone of an often explicit social contract made by the majority governments at

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<sup>14</sup> Thus according to Delgado and Mellor (1984, p.666) 'the adaptive model of technology transfer will not be sufficient to deal with African problems'. According to Malton and Spencer (1984, p.672), 'Such differences [between Asian and African agriculture] help explain the lack of success to date in the direct introduction of exotic high-yielding cultivars, except for irrigated rice where the environment can be modified to suit the crop. For example, ICRISAT has had little success with direct introductions of Indian sorghum and millet varieties to West Africa. And after seven years of variety trials in which over 2000 varieties were imported for trials in the mangrove swamps of West Africa, the West African Rice Development Association found only two varieties that perform as well as the best local varieties'. On the technological conditions of production under different agroclimatic zones in Sub-Saharan Africa see, Thomas and Whittington, 1969, Malton, 1987, Collinson, 1987, and Kuile, 1987.

independence in an attempt to redress the imbalances of the former colonial regimes'. The establishment of marketing board stations in remote regions and the policy of pan-territorial pricing, for example constituted a substantial subsidy to small producers, and of course a tax on producers with better infrastructure and market access. The grant of subsidized inputs and credits to producers in remote areas constituted a similar tax/subsidy mechanism. A large part of what in recent years has been referred to as taxation of agriculture, thus took the form of a redistribution of income within agriculture through these implicit internal tax/subsidy mechanisms, rather than the 'plundering' of agriculture by the other sectors. This is particularly manifest in the rapid buildup of financial deficits of marketing boards from the mid-1970s in most countries, which meant that agriculture was becoming a growing burden on the rest of the economy.

This strategy seems to have been successful in smallholding areas where other complementary conditions, particularly improved technology and other supporting services, existed; e.g., the smallholder response to new varieties of maize in the so-called maize belt in Southern and Eastern Africa, tea in Kenya and cotton in southern Mali (Mellor, *et al.*, 1987)<sup>15</sup>. The problem with this strategy in many countries, however, was that in most cases these other complementary conditions were not met, and hence the subsidies to smallholders, to the extent that they actually did receive them, did not lead to noticeable productivity gains in agriculture. This can be seen from the poor performance in terms of growth and variability in yields for cereals and coarse grains in most Sub-Saharan African economies, and in particular in relation to Asia, as shown in Tables 7 and 8. As can be seen, the average cereal yields in Sub-Saharan Africa as a whole which were about 50 per cent of those in Asia in the early 1960s, fall to 30 per cent of the latter in the early 1990s (Table 7). An even more disappointing picture is exhibited by the yields of coarse grains, which starting from a more or less equal average value as in Asia in the early 1960s, fell to less than half of the latter in the early 1990s (Table 8).

The main source of the problem was that this strategy very thinly spread the scarce investible resources across vast areas of smallholder agriculture which, as noted above, did not have the basic pre-requisites for modern intensive farming. An important implication of the lack adequate infrastructure, particularly the meager irrigation facilities, is the high degree of year to year variation in agricultural output and yields. As shown in Table 7, the standard deviation of the annual growth rates of average cereal yields was rapidly increasing in Africa, and was between 3 to 4 times higher than Asia during the 1961-95 period. A similar, though more moderate, difference in the variability of yields with respect to coarse grains is evident from Table 8. With such high degrees of variability of yields, indicating the high risks involved for farmers investing in new technologies in African agriculture, the low response of farmers to

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<sup>15</sup> According to Jayne and Jones (1997, p.1522), 'Where smallholder grain production and uptake of hybrid seed and fertilizer have expanded significantly since independence [in South and East Africa], this growth has been associated with major investments in state marketing infrastructure and credit disbursement, and state coordination of credit, input delivery, and assured outlets for crop sale'.

subsidies is not surprising. A more appropriate strategy for the development of smallholder, intensive farming under the prevailing conditions in most Sub-Saharan African countries would have been to concentrate the scarce investible resources within a more limited area, in areas with the highest growth potential, and to encourage the populations of the remoter, less hospitable regions to migrate for work to such growth poles. It is only under such concentrations of population and infrastructural pre-requisites that the conditions appropriate for Asian type intensive farming could be met<sup>16</sup>.

The difference between the more successful Asian agriculture and that of Sub-Saharan Africa, therefore, was not necessarily that one was taxed more heavily than the other. As it is well known, the Japanese agriculture during early Meiji period, and that of post-war Taiwan, were also taxed, and perhaps even more heavily. However, through adequate provision of public infrastructural investment and productivity enhancing technologies, the benefit to the farmers outweighed the effect of taxes. In the case of Africa, on the other hand, taxes were paid by a faction of agricultural producers -- those closer to and with better means of access to major domestic markets, and export cash crop producers -- but the benefits, to the extent that they did not dissipate in the inefficient practices of marketing boards, were spread over vast areas and spent on subsidies to farmers with much less effectiveness than in Asia. The root cause of the problem was of course the extreme limitations of the resource base relative to the size of the required investments. It is to these two issues, namely the indirect taxation of agriculture and the financing of accumulation that we shall next turn in the next two sections.

#### **4. Surplus Labour, Economic Duality, and the Agricultural Squeeze Hypothesis**

A central theme in the debate on agricultural development in Sub-Saharan Africa has been the heavy drainage of agricultural surplus, mainly taking the form of forced indirect taxation, which is argued to have led to the poor performance of the agricultural sector and declining overall economic conditions. For example, according to the World Bank, 'African farmers have faced the world's heaviest rates of agricultural taxation... explicitly through producer price fixing, export taxes, and taxes on agricultural inputs. They were also taxed implicitly through overvalued exchange rates, and through high levels of industrial protection...' (World Bank 1994, p.76). This view, which we may refer to as the agricultural squeeze hypothesis, is a recurrent theme in a large number of the studies on agricultural development in Africa<sup>17</sup>. One indicator which seems to lend support to this view is the apparent extreme duality in sub-Saharan African economies as compared to Asia, with per capita income and productivity in

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<sup>16</sup> This strategy is also suggested by Ahmed and Rustagi (1984) and Hayami and Platteau (1997).

<sup>17</sup> See e.g., World Bank (1994), Lipton (1991), Cleaver (1985), Bates (1984) and the sources quoted there.

the non-agricultural sectors being well above the agricultural sector even in comparison to other developing countries.

One measure of such duality is the ratio of value added per worker in the agricultural sector over value added per worker in the non-agricultural sectors (hereafter referred to as the V-ratio), shown in table 9 for the countries in sub-Saharan Africa and Asia. As shown in the first column of the table, the median for this ratio in Sub-Saharan Africa in the mid-1960s was below 10 per cent, while in Asia it is over 25 per cent, and excluding China and Thailand, over 30 per cent<sup>18</sup>. In Sub-Saharan Africa only five countries, namely, South Africa, Sudan, Nigeria, Ghana and Mali, had relative value added shares close to Asia (over 20 per cent) in 1965-66. Some authors have interpreted the low V-ratios in Sub-Saharan Africa as indication of 'urban bias' and discriminatory taxation of agriculture (see, e.g., Lipton, 1977, 1987). The figures may also appear in conformity with the more popular notions of economic duality in Sub-Saharan Africa and the 'plundering of agriculture' *a la* Schiff and Valdes (1992).

Before interpreting these results, however, a precautionary note on the data is in order. Firstly, as noted by a number of authors, measures of agricultural value added in Africa may be underestimates (see, e.g., Poleman, 1981 and Jaeger, 1992). However, for this to explain the divergence of the median gap in V-ratio between Africa and Asia, there must have been a 50 per cent underestimation in the agricultural value added estimates for Africa, which is not plausible. As is well known, employment data, particularly those of agricultural employment, can be also notoriously error-ridden. There are, however, no reasons for the agricultural employment data in Africa to be so consistently overestimated relative to Asia to give rise to the striking differences shown in the table.

Another cause of concern about the data, which for our purpose could be more important than the problems with employment data, is that the value added figures are measured in market prices rather than factor cost. For the V-ratio to reflect relative incomes received by producers in the two sectors, the factor cost measure would be the appropriate one. This would particularly create a certain degree of inconsistency between the measurements for the two regions due to their different types of agricultural marketing institutions. In most Sub-Saharan African economies a major part of indirect taxes on agriculture in this period are likely to be reflected in the sale/purchase margins of marketing boards which would be allocated to the value added in trade and transport sector rather than indirect taxes on agriculture. In the case of Asian economies, however, the agricultural value added figures include indirect taxes. The Sub-Saharan African figures therefore are likely to be closer to the factor cost concept of value added than the market price notion<sup>19</sup>. This could lead to some overestimation of value added

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<sup>18</sup> China is a special case, where the government at the time restricted the mobility of labour between sectors and areas, hence generating a huge surplus labour in rural areas. See, Karshenas, 1995, ch.9, pp.147-165.

<sup>19</sup> This of course varies across the countries depending on the accounting practices and marketing institutions and the type of the product. According to Ahmed and Rustagi (1984), for example, taxes on food grains which varied from 3 to 10 per cent in

ratios in Asia relative to Africa, but the order of magnitude of such possible overestimation is still relatively moderate<sup>20</sup>.

Though each of the above data problems by themselves may not be sufficient to explain the considerable gap in the median V-ratio between Africa and Asia, their combination can exert a considerable influence on the observed figures for individual countries. The changes in marketing institutions and accounting conventions over time also introduce added reasons to be extremely cautious in interpreting the trends in the behaviour of V-ratios. Nevertheless, with these caveats in mind, the behaviour of the V-ratios may furnish a useful starting point in examining the overtaxation hypothesis in the case of Africa as well as analyzing the contrasting positions of agriculture in the Asian and African economies. The lower V-ratio for the Sub-Saharan African economies could be either due to their lower terms of trade for agriculture relative to Asia, or due to high real productivity differentials between non-agriculture and agriculture relative to the prevailing differentials in Asian countries, or a combination of the two. Of course the different elements of the V-ratio are not independent. An artificially low terms of trade for agriculture, for example through an overvaluation of the exchange rate and high urban wages, can lead to the adoption of capital intensive techniques in the non-agricultural sectors which would further reinforce the price effect on the V-ratio. On the other hand, the technological conditions of production can entail different relative price configurations in different countries. It is in fact our contention that the relatively low V-ratios in Africa, to the extent that they are not caused by measurement errors, are largely due to the technical and institutional conditions of production in African agriculture in contrast to Asia. In order to establish this point, however, we should start with some of the more conventional views, including the agricultural 'squeeze hypothesis', discussed in the literature.

According to the conventional view on the dual structure of the colonial economy in Africa, it would be plausible assume that in the immediate aftermath of the Colonial period the productivity and price factors both played a part in lowering the relative V-ratios in Africa. As noted above, the conventional view is that colonial policy was geared to a highly dualistic economic structure where a highly productive modern sector existed side by side of a vast marginalized indigenous subsistence agriculture. The lack of mobility of labour, due to government restrictions, racial discrimination, or rural poverty, would have prevented the narrowing of productivity differentials between the sectors<sup>21</sup>. At the same time, the existing

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African countries and from 2 to 5 per cent in the Asian countries are internal local taxes, which should be explicitly reflected in the market price figures.

<sup>20</sup> Even assuming as high as a 20 per cent indirect tax on agriculture in Asia, and similar indirect tax rates on non-agriculture in the two regions, the correction for this factor would reduce the relative value added ratios in the table by no more than 5-6 per cent which is relatively small relative to the large differences in these ratios between Africa and Asia. Since indirect taxes on agriculture in Asia are likely to be mainly imposed on exports, and as the agricultural exports in Asian countries in the sample are a fraction of total agricultural production, the 20 percent indirect tax assumption itself is likely to be an exaggerated figure.

<sup>21</sup> This is obvious in the case of countries where mineral exports or other non-agricultural primary exports form the engine of growth of the non-agricultural modern sector. However, the duality between agriculture and non-agriculture could still be maintained even under the conditions where there are no non-agricultural mineral exports and plantation agriculture forms the

evidence suggests that at least in East and Southern Africa the colonial governments used the agricultural marketing boards to price discriminate against the indigenous agricultural producers<sup>22</sup>. While both the relative price and productivity differentials played a part in lowering the V-ratio, the real productivity differentials should have played a more important role during the colonial times. In the early years of the post-colonial period it would be natural for productivity differentials to have persisted for some time. To raise the productivity of the marginal sector would have required massive new investments, and so would the restructuring of the modern sector in accordance with the national factor availabilities which may have also implied a substantial lowering of real wages in that sector. Both of these processes would have required time, and hence it would be plausible to assume that by 1965, the earliest date for which employment data for most of the sample countries are available, the major part of the relative differentials between agriculture and non-agriculture would be still explained by real productivity differentials in the two sectors.

However, one would expect that with growing investment in the hitherto neglected indigenous agriculture by the post-colonial state, with greater mobility of labour and lowering of non-agricultural sector wages, and with the restructuring of the non-agricultural sector towards more appropriate factor proportions and output structure, the productivity differential between the agriculture and non-agriculture would decline over time. Also with growing industrialization, as in the case of other developing countries, the burden of taxation would gradually shift to the non-agricultural sector, and hence the price differentials between agriculture and non-agriculture would decline to more 'normal' levels. Both these tendencies would be expected to narrow the differential in the V-ratio between Sub-Saharan Africa and Asia in the subsequent course of development.

This is of course the ideal scenario, or what one would have expected to observe in the course of development in dual economies of the type the post-colonial Sub-Saharan African countries are believed to have represented. According to the proponents of agricultural squeeze hypothesis, however, misguided government policies in the subsequent period derailed the African economies off such ideal trajectory. According to this view, the macroeconomic, sectoral, and exchange rate and trade policies pursued by most African countries are believed to have led to a drain of resources from agriculture and a widening gap between agriculture and other sectors. The deteriorating terms of trade of agricultural sector, and the resulting productivity gap between agriculture and other sectors, according to this view should be manifested in a declining V-ratio and a growing gap between agricultural and non-agricultural

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engine of growth of the modern non-agricultural sector, as long as there exists a large enough low productivity agricultural sector side by side of the high productivity plantations. In this way, the duality within the agricultural sector would also give rise to an apparent dual structure between non-agriculture and agriculture as a whole. This would be reinforced if the traders and colonial administrators due to their monopoly power also cream off a large share of the income in the high productivity export-oriented part of agriculture.

<sup>22</sup> See, e.g., Jayne and Jones (1997) and sources quoted there.

incomes -- at least up to the early 1980s when severe economic disequilibria forced most governments in the region to introduce reform programmes. As it turns out, however, neither the hypothetical ideal scenario of the dual economy models, nor the trajectory portrayed by the proponents of agricultural squeeze hypothesis fit the observed behaviour of the V-ratios in Sub-Saharan African economies in the post-colonial period.

The trends in the V-ratio for the Sub-Saharan African and Asian countries in the sample for the 1965-95 period are shown in Table 9. As can be seen, the median V-ratio for Africa is more or less stagnant during the 1965-80 period, with some countries showing moderate increases in the ratio. Only three countries, namely, Burkina Faso, Niger and Nigeria, show noticeable declines in V-ratio in this period, in conformity with agricultural squeeze hypothesis. During the 1980-95 period, however, V-ratios in many Sub-Saharan African countries registered much sharper increases, so that by 1995 they had attained ratios equal to Asian norms, though by 1995 the median ratio for Africa (16.6%) was still well below Asia (27 %). There are various factors which can account for the differences across the individual countries as well as the changing behaviour over time of the per capita value added ratio, which could be only adequately explained by detailed country case studies. In this paper, however, we are mainly concerned with possible general tendencies which could be shown to have had an overriding effect on the differential performance between the African and Asian economies, and between the actual trends in Africa and the trends suggested by the agricultural squeeze hypothesis as well as the ideal scenario discussed above. For this purpose we need to decompose the V-ratio into its various constituent elements.

A useful decomposition for our purpose would be to examine the changes in V-ratio in terms of the changes in agricultural terms of trade (the relative price effect) plus the changes in real labour productivity gap between agriculture and non-agriculture. The change in the V-ratio is equal to the change in agricultural labour productivity, minus labour productivity growth in the non-agricultural sector, plus the improvement in agricultural terms of trade. The estimates of these variables for 1965-80 and 1980-95 are shown in Table 10. Despite the diversity of experiences across countries, a number of important contrasting tendencies in Africa and Asia stand out. Firstly, during the 1965-80 period, which is believed to be the period in which African agriculture was being increasingly taxed through the terms of trade effect, the V-ratios in most Sub-Saharan African economies showed positive trends. In fact, a declining V-ratio in this period was more a common trait of Asian countries than the Sub-Saharan African ones. Furthermore, in a few countries in Sub-Saharan Africa where the V-ratios showed significant declines during the 1965-80 period (namely, Burkina Faso, Congo, Lesotho, Mali, Niger and Nigeria), only in one country, namely Niger, there was a significant deterioration in agricultural terms of trade as hypothesized by the agricultural squeeze hypothesis. This of course does not tell us much about the level of taxation of agriculture through the terms of trade effect in Africa, but it indicates that the data considered here do not suggest any

systematic increase in the rate of agricultural taxation during the path of development over the 1965-80 period. This also does not mean that rates of taxation on certain cash crops in some countries did not increase over the 1965-80 period, but that the overall agricultural terms of trade effect did not follow this trend. All this, is of course based on the terms of trade effect measurements done on the basis of implicit GDP deflators for agriculture and non-agriculture with all the related data problems we discussed earlier, to which we shall return again shortly.

Another result shown in Table 10, with regard to the 1980-95 period, is that a significant part of the increase in the V-ratio for most Sub-Saharan African economies during this latter period seems to be explained by the collapse of labour productivity in the non-agricultural sector. The median for the non-agricultural productivity growth for the sample countries in Sub-Saharan Africa was -2.0, in contrast to a 2.5 per cent growth for Asia. Of the 28 Sub-Saharan countries in the sample only 5 achieved positive non-agricultural productivity growth rates during the 1980-95 period, and only four of them showed non-agricultural productivity growth rates which were higher than productivity growth in agriculture. This meant that despite the negative terms of trade effect for agriculture in at least half of the sample countries in Africa, most countries achieved increasing V-ratios during the 1980-95 period (Table 10). Thus the observed trends in the past three decades in the Sub-Saharan African economies also seem to exhibit a totally different picture from the ideal scenario pictured above. By the mid-1970s in most countries in the sample the V-ratio had not shown discernible changes, indicating the continuity of the apparent economic duality inherited from the colonial times. Even during the 1980s when a number of countries showed signs of convergence between agricultural and non-agricultural productivities, this was in major part explained by the collapse of the non-agricultural productivity than by fast rates of growth of productivity in agriculture. The improvement in agricultural terms of trade in some African countries during that decade, therefore, did not mean a shift of taxation to the buoyant non-agricultural sector, as envisaged in the ideal scenario discussed above, but rather it meant rapidly declining real wages in the non-agricultural sector in that decade.

To what extent are the above observations affected by the data problems discussed at the beginning of this section? Measurement errors would certainly make comparison of V-ratios across the countries problematic. But as noted above, even allowing for such measurement errors, there is strong evidence to suggest that V-ratios in the 1960s for Sub-Saharan Africa were in general well below the Asia average. If we assume that estimation methods have remained consistent over time then the trends in real productivity growth rates in agriculture and non-agriculture would probably be less affected by such measurement errors. The same cannot be said about the trends in implicit deflators and hence the terms of trade measures in Table 10. As noted above, changes in marketing institutions and accounting procedures can affect these substantially. For example, an African country which dismantles its marketing boards in the early 1980s and instead introduces an indirect tax of 30 to 40 per cent on

agricultural sales would register a proportionate increase in agricultural implicit deflators measured in market prices, without this necessarily affecting the price received by the producers. For this reason the terms of trade improvements for some African economies during the 1980s shown in the table may be overestimates. For the same reason the increase in the V-ratio for the same countries during the 1980s would be an overestimate. These considerations, however, do not seriously affect the main conclusions which matter for our discussion, namely that the V-ratio in Sub-Saharan African countries on average was appreciably below Asia in the 1960s, and that in the subsequent period the ratio did not decline appreciably.

How can one then explain the lower V-ratios in Sub-Saharan African economies relative to Asia? This question was first raised by Lipton (1977) in the context of developing countries in general, while he also pointed out the extremely low ratios for African countries relative to other developing countries. In a later paper Lipton has reiterated the point in the specific context of Africa (Lipton, 1987). In the absence of any other explanations Michael Lipton puts this down to the effect of over-taxation of agriculture and the 'urban bias' of government policies in these economies<sup>23</sup>. It is however difficult to believe that during the 1960s, some of the sparsely populated countries in Sub-Saharan Africa, with rich mineral exports (e.g., Zaire or Zambia), taxed their agriculture more than some of the densely populated, resource poor, countries in Asia (e.g., Bangladesh, India, Sri Lanka). Instead, here we argue that the relatively low V-ratios in Africa can be explained in terms of the structural characteristics of the agrarian economies in Sub-Saharan Africa in contrast to Asia discussed above.

As discussed in Section 3, due to these structural differences between the agricultural systems in the two regions, we would expect wages in the non-agricultural sector in the post-colonial Sub-Saharan Africa to be on average much higher than Asia relative to agricultural prices. Assuming a closed economy setting to start with, and further assuming the same non-agricultural technologies and industrial markups in the two regions, non-agricultural prices relative to agricultural prices in Africa would be also proportionately higher. Technologies in the non-agricultural sectors of the two regions, however, would not be the same. In Africa higher wages would induce the use of labour saving technologies with a much higher capital intensity as compared to Asia. This would increase labour productivity in non-agriculture relative to agriculture in Africa and hence push down V-ratios further. Depending on the degree of protection of the non-agricultural economy and the prevailing market structures, this effect may be somewhat alleviated if higher labour productivity in the non-agricultural sector somewhat reduces the relative price differentials between agriculture and non-agriculture in favour of agricultural products.

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<sup>23</sup> After a search for different possible explanations, Lipton (1977, p.163) concluded, 'Neither historical compulsions, then, nor the specific features of groups of LDCs, can account for today's huge and on balance growing disparities [in V-ratios]'. He then goes on to assert that 'Urban biases in private and public power, and hence in pricing and resource allocation, are needed to explain high disparities..'

We may relax some of the assumptions of this simple account of matters in a closed economy context. There are further technical aspects of agricultural production in Sub-Saharan Africa which would help explain lower observed V-ratios relative to Asia. These arise from climatic conditions which introduce a high degree of seasonality of agricultural labour in Sub-Saharan Africa compared to Asia (see, Delgado and Ranade, 1987). This would not have affected the V-ratios if productivity measurements were done in terms of hours of work. However, since the observed V-ratios are measured in terms of relative value added per labourer, the shorter agricultural season would *ceteris paribus* reduce the observed ratios in Africa relative to Asia. V-ratios measured in value added per man year would increase with the growth of irrigation, multiple cropping, and the development of intensive farming which would spread agricultural labour more uniformly over the year, that is, as the regularity of agricultural work approaches that of non-agriculture.

We can then proceed to relax the assumption of closed economy, but the picture would not change dramatically. In economies where the non-agricultural sector is protected, as was the case in most countries under study here, the availability of more capital intensive imported technology would help compensate for high non-agricultural wages in Sub-Saharan type economies by increasing labour productivity, and would hence push the V-ratio even further down. Even under free trade, as long as the prevailing agrarian institutions remain intact, the differentials in V-ratios between Asian and African type economies would remain high, because most of the non-agricultural output in fact consists of non-tradable services. However, in Sub-Saharan African type economies which over the years have built up a sizeable non-agricultural sector under protection, a sudden liberalization of trade would have a dramatic effect, as these countries will soon find out that none of their non-agricultural industries, even if they are technically efficient by international standards, could survive international competition from lower wage Asian type economies. The opening up of such economies to international competition would have a strong deflationary effect on the non-agricultural economy in the short and medium run. The resulting recession in the non-agricultural economy would lead to an increase in the V-ratio by both depressing non-agricultural real wages and reducing non-agricultural output and productivity. With the resumption of growth, however, the V-ratios would once again tend to their 'normal' levels. Such 'normal' levels would of course be changing in the long run with population growth, agrarian change and particularly with the introduction of labour saving investments in agriculture.

The results of the following econometric exercise may further help to substantiate empirically the above hypothesis regarding the source of variation of V-ratios across countries in Asia and Sub-Saharan Africa. V-ratios according to this hypothesis are systematically related to two factors; first, the effect emanating from the prevailing agrarian relations which may be referred to as the surplus labour effect, or the wage effect, and second, the resulting labour intensity of non-agricultural production or the productivity effect. We have taken land/labour ratio as a

proxy variable for the first effect. It should be emphasized that the surplus labour phenomenon is not simply a reflection of land labour ratio, but it is essentially a reflection of the prevailing agrarian relations. The case of South Africa is a good example of this point. Despite low levels of labour/land ratios, South Africa, through forced eviction of its indigenous agricultural population and colonization of new lands managed to establish a highly mechanized and commercialized farming sector with a predominant use of wage labour and extremely high levels of labour productivity (Table 4). This also generated a surplus labour, mainly residing in labour camps and labour reserve towns, which solved the labour shortage problem of the non-agricultural sector. The transformation of production conditions in agriculture in South Africa was not simply a matter of availability of capital to be substituted for labour either. It was first and foremost a forced transformation of agrarian relations and generation of a surplus labour. However, since few other countries resorted to such extreme measures as South Africa, and in the absence of better proxy variables, we have used the labour/land ratio as a proxy for the reservation wage in non-agriculture relative to average productivity of labour in agriculture.

For the second explanatory variable, namely labour intensity in non-agricultural production we have taken the share of non-agricultural labour force normalized by the level of per capita income, as a proxy. The justification is that, as shown by Kuznets, Chenery and others, the shares of agricultural output and employment appear to systematically vary across countries and over time according to level of economic development as measured by per capita income. High labour intensity in the non-agricultural sector resulting from low wages in Asian type economies would be therefore expected to be reflected in higher non-agricultural employment normalized by per capita income. This variable was constructed by dividing the share of non-agricultural labour by per capita GDP measured at purchasing power parity exchange rates. The V-ratio is therefore expected to have positive relationship with the two independent proxy variables as defined. The following equation was estimated using a cross-section regression on 1965-70 average variables for 36 countries in our sample for which the relevant data were available:

$$\begin{array}{rllll}
 \text{V-ratio} = & -6.17 & + 0.74 \text{ L/A} & + 0.77 \text{ Z} & \text{Adjusted } R^2 = 0.67 \\
 (\text{t-ratio}) & (-2.05) & (4.11) & (5.61) & \text{No. of Observations} = 36
 \end{array}$$

where L/A is land-labour ratio and Z is the labour intensity variable<sup>24</sup>. As can be seen, both estimated coefficients having the expected signs are highly significant, and the two variables jointly explain close to 70 per cent of variations in the V-ratio across the sample countries. Considering that we have not included any variables directly related to relative prices or terms of trade effect between agriculture and non-agriculture, the goodness of fit of the regression is indeed remarkable and lends further support to the hypothesis put forward here.

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<sup>24</sup> Labour/land ratio is based on data in Table ??, and share of non-agricultural labour is based on data in Table ?. Per capita GDP at international prices in 1965 is based on Penn World Tables, Mark 5.6. The land/labour ratio variable was multiplied by 10, and the capital intensity ratio by 100, in order to avoid unnecessary decimal points in coefficient estimates.

It appears that once the surplus labour effect or the effect of the differential agrarian structures across the countries is taken into account, the relatively low V-ratios in the Sub-Saharan Africa are no longer puzzling. What indeed requires explanation in this new context is why the V-ratios in countries such as Ghana, Nigeria and South Africa amongst the African countries were so high. The case of South Africa should be clear by now. As noted above it has a totally different agrarian structure as compared to other countries in Africa, or Asia for that matter. Other outliers such as Ghana and Nigeria need specific country analysis. It would be, however, absurd to conclude on the basis of the high V-ratios in Ghana and Nigeria that in these countries the non-agricultural sectors are 'plundered' by agriculture, in the same way as it is absurd to maintain that low V-ratios are indicative of the agricultural sector being 'plundered'.

## **7. Financing Accumulation and Surplus Labour**

A large share of the required investment for the development of smallholder intensive agriculture in post-colonial Sub-Saharan Africa took the form of public goods which had to be produced by the government -- e.g., roads and communications, electricity, large scale irrigation and land improvement, research and extension services etc. It may not be therefore inappropriate to begin with the financial constraints facing the governments in the region. The problem of financing public investments of this type has been extensively discussed in the economic development literature in relation to surplus labour economies. Given the possibility of using labour intensive techniques with minimum requirements of foreign exchange or other scarce resources for this type of investment, it has been argued that in surplus labour economies at early stages of their development financial constraints should not pose any serious problems for such investments. To quote Arthur Lewis (1954, p.160):

Roads, viaducts, irrigation channels and buildings can be created by human labour with hardly any capital to speak of -- witness the Pyramids, or the marvellous railway tunnels built in the mid-nineteenth century almost with bare hands. Even in modern industrial countries constructional activity, which lends itself to hand labour, is as much as 50 or 60 per cent of gross fixed investment, so it is not difficult to think of labour creating capital without using any but the simplest tools.

The problem of financing investments of this type in a labour surplus economy thus becomes one of what the classical economists referred to as the procurement of a wage fund. As long as agricultural productivity grows at a rate sufficient to provide food for the newly employed labour in the investment sector without inflationary food price effects, there would be no financial constraints as such to the amount of investment that can be undertaken. Once the existence of surplus labour ensures the availability of labour at given real wages, the investment by government or other non-agricultural sectors would be to a large extent self financing, in the sense that the surpluses generated in the economy as a result of the new investments, and the taxes generated thereby, would finance the original investment (see, e.g.,

Lewis, 1954, Kalecki 1970, Kahn, 1972). Under these circumstances, even if the original investment is financed by money creation, by the time of the completion of the investment projects an equivalent amount of savings is generated in the economy, with no, or very moderate price inflation<sup>25</sup>.

This classical model which is highly relevant to the experience of Asian economies, however, breaks down in the case of labour constrained Sub-Saharan African type economies. In the case of labour constrained economies, major investment attempts by the government without prior procreation of the required savings through taxation would dissipate in inflationary spirals, as the movement of labour from the food producing sector to the new investment sector would reduce the supply of food while increasing the demand for food outside agriculture. The resulting rise in food prices and in the incomes of the smallholder food producing sector, under the prevailing conditions in Sub-Saharan African agriculture, would be also unlikely to generate the necessary finance through voluntary savings of small farmers. The extreme backwardness of rural financial markets in Africa<sup>26</sup>, and the lack of opportunities for profitable investment in their own production activities, because of the lack of appropriate production technologies and the necessary infrastructure, would mean that higher incomes are likely to be by and large translated into higher consumption by farmers (see, e.g., Delgado and Ranade, 1987). This is an additional reason for the significance of taxation for capital accumulation in Sub-Saharan African labour constrained type economies.

In Sub-Saharan African countries which were not large mineral exporters, the major source of government tax revenue in the immediate post-colonial period inevitably had to be the agricultural sector. The majority of agricultural producers, namely the smallholder food producing sector, however, were not taxed and as noted above appear to have been the recipients of relatively large subsidies. This was only partly due to the post-colonial 'social contract' which underpinned the politics of the newly independent states as discussed above. Direct taxes are very difficult to administer with respect to millions of small subsistence producers, specially under the conditions prevailing in African agriculture. Even indirect taxes, e.g., through the purchase prices of marketing boards, would be difficult to implement under these circumstances; as, when official prices are below market prices it would be extremely costly to ensure delivery to the marketing boards by millions of dispersed small producers. The main burden of taxation therefore in economies which did not have major

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<sup>25</sup> There would be no inflation if workers and agricultural producers only consumed food. Since this is not the case, short term inflationary pressures would result depending on the extent of excess capacity in the non-agricultural consumer goods producing sectors and the rapidity of investment response in these sectors. In the long run, however, by the time sufficient capacities are generated in the consumer goods sectors, price levels and real wages would return to their initial levels. All this of course critically depends on the surplus labour assumption.

<sup>26</sup> For an overview of financial institutions in Sub-Saharan Africa see, Nissanke, 1997.

mineral exports had to fall on the export cash crop producers, because they were more amenable to government boarder controls<sup>27</sup>.

Taxation of the smallholder food producing sector in Sub-Saharan African type economies, could have played a dual role in financing investment. Apart from procuring the necessary revenue for government investment, it could also help keep wages in the non-agricultural sectors low, by lowering the post tax average product of labour in agriculture, or the reservation wage for workers in non-agriculture<sup>28</sup>. In the absence of such taxes, therefore, the export cash crop producing sector would be doubly squeezed; once to raise revenues to finance government investment, and once as a result of the rise in real wages resulting from the transfer of labour from the food sector to the investment sector. This latter type effect, which amounts to a revaluation of the real exchange rate facing cash crop producers (a rise in the price of non-traded goods relative to export cash crops), also takes place when government investment is financed by revenues from mineral exports or by foreign aid. However to the extent that these other types of financing also provide the foreign exchange for the import of cheaper foodstuff and other wage goods, they can shift part of the burden off the export cash crop sector to the food producing sector.

At this stage it may be appropriate to make a short digression in order to put into proper context two common misconceptions about the post-colonial development of Sub-Saharan African economy. One is that the adverse movement of the terms of trade between cash crop exports and non-tradables (i.e., the apparent overvaluation of the exchange rate) is often attributed mainly to the import substitution industrialization policies followed by the African governments. It should be clear by now that any major investment effort in social and economic infrastructure, necessary to support the growth of intensive smallholder farming in Sub-Saharan Africa, would have led to similar 'overvaluation' of the exchange rate given the labour constrained economies of the region and the inability of the government to tax the smallholder food producing farmers. The building of roads, waterways, ports, schools, hospitals, and the training of teachers, technicians, nurses, doctors, scientists, agronomists etc. as well as the creation of trade networks, urban centres and other related services, are all pre-requisites of modern agricultural development. All these activities are much more labour intensive than modern import substitution manufacturing. Given the very small share of non-agricultural labour employed in modern manufacturing in most Sub-Saharan African economies, even if the whole sector was eliminated it would not help much in removing the labour constraint in these economies. Of course to the extent that the manufacturing sector has

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<sup>27</sup> This sharp distinction between export cash crop and food producers is only possible where all the land suitable for export cash crops is fully cultivated for this purpose. This is not however the case for many African countries and there are varying degrees of substitution between food and export cash crop production. To the extent that there are food producers with easy access to markets and with land suitable for export cash crops, they should be also included in the category of agricultural producers which were taxed.

<sup>28</sup> According to Lewis (1954, p.174) an important effect of land taxes in Meiji Japan was to keep industrial wages down.

been a net user of foreign exchange, a less protective industrial policy would have released foreign exchange which could have helped to increase other investment activities as far as allowed by the possibilities for capital labour substitution or foreign exchange labour substitution for such investments. This leads us to the discussion of the second misconception, regarding the capital intensity (or the foreign exchange intensity) of investment projects in Sub-Saharan Africa.

Public sector investments in Sub-Saharan Africa have been usually much more foreign exchange intensive than similar projects in Asia. For example, according to Ahmed and Rustagi (1984), the import content of transport costs in Kenya and Tanzania is about 50 per cent compared with an average import intensity of only 17 per cent in Indonesia and Bangladesh. Some authors have attributed this mainly to the policy bias by the governments or the interests of aid donors, and have suggested that a more labour intensive technical choice with more reliance on domestic resources, along the Asian lines, would have reduced the financial burden of public investments. This is not however an entirely satisfactory argument. Under the conditions of labour constraint in Sub-Saharan Africa, any attempt to emulate the labour intensity of Asian investment projects would have led either to a drastic reduction of total investment or a substantial transfer of labour out of agriculture with a rapid increase in wages relative to the price of exportables and a large and unsustainable food import bill.

The above is not to deny that policy mistakes in terms of both the choice of technique and the choice of investment sector have played a part in the development problems of Sub-Saharan African agriculture. However, to focus solely on the failed industrialization attempt and the corruption of government officials or self-interest of aid agencies would divert attention from the more fundamental problems of development in the region. Such a one-sided focus can give rise to simplistic policy conclusions that once industrial protection is removed, free trade is reinstated, the role of government is reduced and foreign aid is curtailed, all will be well. With the severe shortages of public infrastructural capital and serious financing problems resulting from the labour constrained nature of most economies in the region, such policy conclusions will be highly unrealistic. Having made these points, we shall end this short digression and resume our discussion of the problems of financing accumulation in the region.

The available evidence does not allow exact estimates of the burden of taxation in Sub-Saharan African economies, which in any case would require a detailed country-by-country study. Under the prevailing conditions in most post-colonial Sub-Saharan African economies, however, it is clear that the main burden of taxation had to fall on the foreign trade sector, either export cash crops or mineral exports and in some cases on food producers with better access to markets and with high substitution possibilities for cash crop production. The rest of the economy was either too small (e.g., manufacturing sector profits) or too costly to tax (e.g., small food producing sector in the outlying regions or informal services). To the extent that high non-agricultural wages were a reflection of the high supply price of labour under the

prevailing agrarian conditions, without taxing the small food producers the taxation of non-agricultural wages also could not be very effective in raising government savings. The extent to which agriculture as a whole was taxed depended on specific country conditions, e.g., whether there existed a relatively large mineral exporting sector and the nature of the 'social contract' underpinning the politics of the newly independent states. As noted above, through the pan-territorial pricing system and direct input subsidies, at least a part of the agricultural producers appear to have received considerable subsidies during the period of operations of marketing boards. In particular, the growing net deficits of the marketing boards indicates that in most countries the outlying food producing sectors were increasingly becoming a net burden on the rest of the economy.

Similar considerations also underpin the low saving capacity of the private sector in Sub-Saharan Africa relative to Asia. As the experience of various Asian countries has shown, when the appropriate technological conditions for profitable investment in agriculture exist, small peasant proprietors do show a high propensity to save and invest in agriculture and related rural activities. For most smallholder producers in Sub-Saharan African agriculture, however, as noted above, the appropriate conditions did not exist, and in the case of cash crop producers and more prosperous food producers with better access to markets and with adequate infrastructure, a good part of their surpluses were likely to have been taxed through the pan-territorial pricing system and export taxes. What however is likely to have contributed most to the different savings performances of the private sector in the two regions over time, is the rapid growth of an industrial capitalist sector in Asia, and the resulting increase in the share of profits in national income, and the weakness of this development in post-colonial Africa. As pointed out by Arthur Lewis (1954, p.157), 'the major source of savings are profits, and if we find that savings are increasing as a proportion of national income, we may take it for granted that this is because the share of profits in the national income is increasing'. This seems to have been indeed the case in relation to the Asian countries where according to recent studies the so called 'investment-profitability-savings nexus' has been at the center of rapid increase in saving ratios (see, e.g., Akyuz and Gore, 1996 and Singh, 1996). The existence of surplus labour is again critical for the Asian economies to have outperformed African economies in this respect. Surplus agricultural labour allowed the rapid expansion of the capitalist sector which increased the share of profits in national income in Asia. In addition, as discussed in the previous section, the slow increase in real wages, relative to labour productivity growth in the modern sector in Asia, implied a growing share of profits within the sector itself. In contrast, rising real wages in Sub-Saharan African labour constrained economies has meant both a slower growth of the capitalist sector and a lower rate of appropriation of the fruits of productivity growth by profits. To some extent most Sub-Saharan African economies seem to have tried to get round this handicap by relying on more capital intensive imported technology. This strategy which would initially appear to be effective in relieving labour shortages and attaining a higher share of surplus in the modern sector, is however unlikely to be sustainable

in the long run. Given that Sub-Saharan African countries could not compete with more industrialized countries using similar capital intensive techniques, combined with the mounting import requirements of this strategy, it would sooner or later lead to a balance of payments crisis.

It should not be therefore surprising to observe that one of the most striking comparative features of the development process in Asia and post-colonial Sub-Saharan Africa has been the difference between their savings performances. This can be seen from Table 11, which shows national savings and national resource gaps as a percentage of GDP for the sample countries in the two regions over the 1965-94 period. National resource gap is defined as national savings minus gross domestic investment. Despite the possibly very serious measurement errors in savings ratios, the figures shown in the table can give an overall picture of broad regional averages and trends in savings ratios which may not be far off the mark. As can be seen, during the 1965-74 period, the first post-colonial decade for which data is available, the average savings ratio for Sub-Saharan Africa was less than Asia average, but the gap between the two regions in this period was closing rapidly. From the mid-1970s, however, while the average Asian savings ratios continue their upward trend, the average saving ratios in Africa follow a declining trend. While during the 1970-74 period the average savings ratio in Africa was only about 5 percentage points below Asia, which was not statistically significant, by 1990-94 the gap between the two had widened by a staggering 17.5 percentage points (Table 11).

A detailed quantitative study of savings ratios in the two regions falls beyond the confines of the present study. However, a number of observations on the behaviour of average savings ratios in the two regions in the light of our previous analysis can be made. The first point is that during the 1965-75 period the savings effort in Africa, as indicated by savings ratio relative to the level of per capita GDP, was relatively better than in Asia and was improving over time. For example, comparing the data on savings ratio in Table 11 with per capita GDP figures in Table 12, it can be seen that during the 1970-74 period, average savings ratio in Africa was 14.2 %, which was equal to the average for Asia during 1965-69, while average per capita GDP level in Africa in 1970-74 was only 80 per cent of the 1965-69 per capita GDP level in Asia. The reason for the relatively high savings ratios during the early years of the post-colonial period in Africa was the high share of exports in GDP in these countries and the vigorous investment efforts by the governments in the region using the proceeds from the taxation of the export sector. As shown in Table 12, during 1965-69 period average export ratio for Africa was 24.1 per cent which was about 9 percentage point above Asia average. The proceeds from the export sector combined with foreign aid allowed relatively high investment rates in Sub-Saharan Africa during the first post-colonial decade. As can be seen from Table 11, average investment ratio (combined savings ratio and national resource gap) during 1965-74 in Sub-Saharan Africa was only 2-3 percentage points below Asia average.

The fact that both these sources of financing (i.e., export revenues and foreign aid) were in foreign exchange allowed the investment process to continue in the face of the labour constraints in Africa, by increasingly relying on more capital intensive imported technologies.

In the subsequent period, however, other structural elements discussed above came to their own and led to a rapid divergence in the trends in savings ratios in the two regions. From the mid-1970s, growing instability in commodity export prices and a persistent deterioration in primary commodity terms of trade undermined the main sources of foreign exchange, savings, and government revenue in most Sub-Saharan African economies. As can be seen from Table 13, most Sub-Saharan African countries during the 1975-93 period have been subject to severe negative terms of trade shocks. Though on average the impact of the adverse terms of trade movements on Asia and Africa does not seem to be significantly different, the much more diversified export base of the Asian countries has meant that they could cope with the resulting income losses much more easily. As shown in Table 13, the average share of manufacturing exports for Asia in 1970-75 was about 36 per cent, and by the early 1990s these countries were able to increase this share to over 70 per cent. The flexibility with which the Asian surplus labour economies could respond to adverse terms of trade shocks by increasing the volume of their manufactured exports, could not be emulated by the African high wage, labour constrained economies under any conceivable policy regime<sup>29</sup>. In this respect it is important to note that a few countries in Africa, such as Ghana, who have managed, by dint of exchange rate devaluations and wage compression, to increase their share of manufactured exports since the mid-1980s, have suffered phenomenal terms of trade losses (Table 13)<sup>30</sup>. From the mid-1970s, therefore, with the declining export revenues, partly due to the terms of trade effect, partly due to supply constraints at home, and partly due to demand constraints facing primary exporters, the growth process in most Sub-Saharan African economies came to a standstill. Initially, during the second half of the 1970s, some African countries managed to increase their pace of investment by a substantial increase in foreign borrowing. The average external resource gap for Africa, which was not significantly different from Asia in the earlier periods, jumped to more than half of the national savings ratio in 1975-79 (Table 11). From the early 1980s, however, a declining savings ratio has meant that the pace of investment could be only maintained with a rapid build up of foreign debt. The national resource gap in Sub-Saharan Africa on average has increased by more than four folds between the early 1970s and the early 1990s, while the savings ratio has declined by nearly 50 per cent, with the investment ratio remaining on average more or less stable at around 18-19 per cent, about 10 percentage points below Asia average (Table 11). Whether, and to what extent, this phenomenon has been

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<sup>29</sup> It should be of course noted that not all the Asian economies by the mid-1970s were surplus labour economies. However, countries such as Korea, which by then had passed the surplus labour stage, had already achieved high levels of technological sophistication and industrial export shares. The case of South Africa is of course also different from the labour constrained economies in Africa, as we have already pointed out above.

<sup>30</sup> In Ghana for example the real exchange rate in 1990 was twenty times lower than the 1983 level.

reinforced by the adjustment policies pursued by most countries in Africa since the 1980s, is a question which we cannot pursue in this paper, but needs serious attention.

In recent years it has become increasingly popular amongst economists to regard low savings ratios in developing countries as a consequence of high rates of foreign aid. In view of the declining per capita incomes (particularly noticeable in the non-agricultural economy), and the structural problems which have undermined the savings capability of most Sub-Saharan African economies since the late 1970s, this seems to be a misguided view, at least as far as Africa is concerned. Another popular belief, which in the light of the above analysis proves to be misguided, is that high wages in Sub-Saharan African economies are the result of high rates of inflow of foreign aid. As noted above, the availability of foreign exchange which makes it possible to use capital intensive technologies, if anything, would reduce wage pressures at any given rate of investment. Sub-Saharan African economies could not have maintained the same rates of investment, which clearly have not been very high, while using more labour intensive technologies, as long as they were not prepared or were not able to tax the smallholder agricultural producers.

## 7. Concluding Remarks

One of the important contributions of Lewis's 1954 paper, at least in relation to the current generation of students of development, is that it demonstrates the relevance of the classical political economy traditions to the modern problems of development. This point is made in a striking fashion in the first sentence of Lewis's paper, purported to be 'written in the classical tradition, making the classical assumption, and asking the classical question'. However, to make the paper palatable to the student of modern economics, much of the reasoning in the main body of the paper was done using the marginalist language of neo-classical economics. This was on the one hand a point of strength of Lewis's paper, as it linked the classical traditions with modern modes of reasoning in economics. On the other hand, this turned out to be also a weakness as a large part of the subsequent literature got engaged in showing the contradictions of the Lewis model in a neoclassical context or demonstrating the conditions of possibility of surplus labour within that framework. In the meantime, what Lewis called 'asking the classical question' was more or less forgotten. On the policy front the development agenda became gradually dominated by the so-called Washington consensus and policy analysis was replaced by the ideological debates on state versus the market. Much of the recent literature on comparative development of Asia and Africa has been developed in the context of such policy debates.

In this paper we have made a reappraisal of comparative development paths of Asia and Africa using the classical framework of the Lewis model, and asking the classical question of the

conditions of accumulation and growth in the context of specific agrarian systems of production in the two regions. An important aspect of the production conditions in post-colonial Sub-Saharan African countries, which distinguishes them from Asian economies, has been the relative abundance of land in relation to labour and the meagre stock of man-made capital in African agriculture. This has profoundly affected the nature and the development path of agrarian institutions and production relations, as well as the conditions of production in the non-agricultural sectors and the intersectoral relations in the two regions. The post-independence governments in both regions followed broadly similar strategies of development, centred around the construction of national economies and industrialization. In the case of Asian countries the existence of an abundant supply of labour in agriculture allowed fast rates of industrial growth to take place at low and competitive wages. This also meant that after a period of learning and skill acquisition, the new industries in Asia could become competitive enough to export and hence further benefit from economies of scale and learning by exporting. The abundant supply of labour in the countryside in densely populated Asian economies also contributed to the creation of an adequate infrastructure and the ease of integration of the agricultural sector in the national market. Under these circumstances the growth of agricultural and non-agricultural sectors assumed a complementary and mutually reinforcing character.

The move from import substitution industrialization to export oriented strategies of development in various Asian countries over time was thus the outcome of natural processes of development in these countries. In the case of Sub-Saharan African economies, however, with limited supply of labour and relative abundance of cultivable land, the non-agricultural sectors faced relatively high and steep wage curves. This meant that unlike Asia, most of the import substituting industries which were developed in the post independence period could be only sustained under increasing protection. The lack of basic infrastructure in most African countries prevented the integration of a large part of the agrarian economies into the national and international market. The low degree of market integration of African agriculture meant that the post-colonial states had to play a more direct role in creating a national economy and in intersectoral resource flows than in Asia. The financial requirements for the setting up of the basic infrastructural pre-requisites of a modern economy were however beyond the reach of many sparsely populated agrarian economies in Sub-Saharan Africa, particularly those countries without rich mineral exports. A prominent aspect of this financing problem was the lack of surplus agricultural labour, which in the case of densely populated countries in Asia had played a critical role in labour intensive infrastructural investment in agriculture. Under these circumstances, and given the lack of capital and appropriate technologies to alleviate the agricultural labour constraint, the substitution aspect of sectoral growth rates became more prominent than the complementarities as was the case in surplus labour Asian economies.

Policy lessons from the Asian experience which do not take into account the structural differences between the agrarian economies in the two regions sketched above, are likely to be

misleading. In addition, any relevant policy lessons need to take into account specific country characteristics, particularly those pertaining to agrarian institutions which are likely to be different in individual countries both within and between the regions. Lack of attention to such regional and country specific factors is likely to lead to undue overgeneralizations. As we have noted in this paper, issues such as apparent extreme duality in African economies, their higher degree of capital intensity and foreign exchange intensity of investments, etc. are more the result of the specificity of their agrarian systems than policy bias of their governments. Simple translation of policy lessons from Asia to Africa is bound to produce disappointing results.

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Table 1: Employment Indicators in Sub-Saharan Africa and Asia

	Rural	Employment (%)		
	Population (%)	Agriculture	Industry	Services
	1965	1965	1965	1965
Benin	87.7	83.0	4.7	12.4
Botswana	96.1	88.7	3.6	7.7
Burkina Faso	94.8	89.3	3.4	7.4
Cameroon	83.6	86.3	4.4	9.2
Central African Rep.	73.3	88.2	3.0	8.8
Chad	91.0	92.2	2.8	5.0
Congo	67.7	66.0	11.1	22.9
Cote d'Ivoire	76.9	80.6	4.7	14.7
Gambia, The	86.4	87.6	5.2	7.1
Ghana	73.9	61.0	15.3	23.7
Kenya	91.4	86.1	5.1	8.8
Lesotho	93.7	91.6	2.6	5.8
Madagascar	87.6	85.1	4.3	10.5
Malawi	95.1	92.0	3.2	4.8
Mali	87.4	90.4	1.3	8.3
Mauritania	91.0	88.9	3.2	7.9
Mozambique	95.4	87.4	5.5	7.1
Niger	93.2	95.2	1.0	3.8
Nigeria	83.0	72.1	10.2	17.8
Senegal	67.3	83.3	5.5	11.3
Sierra Leone	84.6	78.4	10.9	10.7
South Africa	52.8	31.9	29.5	38.6
Sudan	87.0	81.5	4.8	13.7
Tanzania	94.7	91.5	2.7	5.8
Uganda	93.5	90.9	2.9	6.2
Zaire	73.9	82.0	9.2	8.8
Zambia	76.7	78.7	8.0	13.3
Zimbabwe	85.6	79.2	7.9	13.0
<b><u>Africa (median)</u></b>	<b><u>87.2</u></b>	<b><u>86.2</u></b>	<b><u>4.7</u></b>	<b><u>8.8</u></b>
<b><u>Asia (median)</u></b>	<b><u>80.7</u></b>	<b><u>65.2</u></b>	<b><u>12.5</u></b>	<b><u>21.2</u></b>
Bangladesh	93.8	83.7	4.8	11.4
China	81.8	80.8	8.2	11.0
India	81.2	72.9	11.9	15.1
Indonesia	84.2	70.5	9.0	20.5
Korea, Republic of	67.6	55.1	15.1	29.8
Malaysia	70.1	58.6	13.0	28.5
Pakistan	76.5	59.8	18.3	21.9
Philippines	68.4	58.0	15.8	26.2
Sri Lanka	80.1	56.0	13.9	30.1
Thailand	87.1	81.7	5.2	13.1

Source: World Bank, World Development Indicators, 1997.

Table 2: Labour Land Ratio and Population Growth in Sub-Saharan Africa and Asia, 1965-94

	Labour / Land Ratio <sup>(1)</sup>		% Land <sup>(2)</sup>	Population Growth Rates <sup>(3)</sup>	
	1965	1994	Under Crops	Rural	Total
	1965	1994	1965	1965-94	1965-94
Benin	591	629	76	1.8	2.7
Botswana	8	10	2	2.5	3.4
Burkina Faso	292	521	27	1.7	2.4
Cameroun	316	396	74	1.3	2.7
Central African Rep	186	243	37	1.7	2.3
Chad	25	51	6	1.6	2.1
Congo	31	47	1	1.1	2.8
C'te d'Ivoire	122	164	17	2.9	3.9
Gambia	601	1169	40	2.9	3.4
Ghana	170	341	28	2.3	2.7
Kenya	143	377	16	2.8	3.6
Lesotho	181	135	14	1.9	2.6
Madagascar	97	177	9	2.4	3.0
Malawi	594	1128	39	3.2	3.5
Mali	51	121	5	2.0	2.6
Mauritania	9	13	1	0.1	2.5
Mozambique	81	143	6	0.9	2.2
Niger	163	251	18	2.7	3.1
Nigeria	214	229	42	1.7	2.8
Senegal	172	341	29	2.3	2.8
Sierra Leone	334	396	16	1.1	2.0
South Africa	24	19	13	2.3	2.5
Sudan	32	54	10	2.4	2.8
Tanzania	153	318	7	2.3	3.1
Uganda	538	896	73	2.9	3.1
Zaire	301	520	32	3.1	3.1
Zambia	29	76	14	2.3	3.3
Zimbabwe	79	164	11	2.4	3.1
<b><u>Africa (median)</u></b>	<b><u>158</u></b>	<b><u>236</u></b>	<b><u>16</u></b>	<b><u>2.3</u></b>	<b><u>2.8</u></b>
<b><u>Asia (median)</u></b>	<b><u>866</u></b>	<b><u>1132</u></b>	<b><u>89</u></b>	<b><u>1.2</u></b>	<b><u>2.1</u></b>
Bangladesh	1637	3932	94	2.0	2.4
China	866	1035	29	1.2	1.6
India	851	1355	92	1.8	2.1
Indonesia	751	1132	68	1.2	2.1
Korea, Rep.	2343	1427	99	-2.6	1.5
Malaysia	427	237	95	1.1	2.5
Pakistan	426	888	79	2.4	3.0
Philippines	934	1095	89	1.2	2.4
Sri Lanka	1024	1513	87	1.6	1.5
Thailand	977	961	97	1.9	2.1

Notes: 1. Labour land ratio is defined as persons per hectare of agricultural land (Arable land plus pastures).

2. Percentage agricultural land under annual and permanent crops (including fallow).

3. Growth rates refer to annual trend growth rates. Medians refer to the countries in the Table.

Source: FAOSTAT

Table 3: Irrigation Ratio, Fertilizer and Tractor Use in Sub-Saharan Africa and Asia, 1965-94

	Fertilizer Consumption			Irrigation Ratio			Tractors in Use		
	1965	1980	1994	1965	1980	1994	1965	1980	1994
Benin	1.1	0.6	14.5	0.2	0.4	0.7	0.7	0.8	1.0
Botswana	5.3	3.5	2.4	0.5	0.5	0.2	30.0	53.8	142.9
Burkina Faso	0.0	1.6	6.6	0.1	0.4	0.7	0.2	0.4	4.6
Cameroun	1.6	5.4	5.0	0.1	0.2	0.4	0.1	1.0	0.8
Central African Rep	0.5	0.8	0.6	0.0	0.0	0.0	0.1	0.8	1.1
Chad	0.2	0.3	2.2	0.2	0.2	0.4	0.1	0.5	0.5
Congo	13.9	3.8	13.1	0.0	0.7	0.7	33.4	50.0	48.3
Cote d'Ivoire	7.0	27.2	22.4	0.4	2.3	2.5	4.2	15.6	12.8
Gambia	2.9	12.7	4.7	0.8	0.6	1.2	3.4	2.8	2.6
Ghana	0.7	6.3	4.3	0.0	0.4	0.2	12.5	18.4	14.6
Kenya	6.9	16.2	34.5	0.4	1.1	1.7	16.4	17.2	35.0
Lesotho	1.5	15.4	18.8	0.8	1.0	0.9	6.5	47.9	57.8
Madagascar	2.7	3.5	4.4	16.6	25.7	42.1	8.6	10.6	12.8
Malawi	4.3	25.4	16.5	0.1	1.4	1.7	3.0	9.1	8.5
Mali	0.3	6.9	8.3	3.6	2.9	2.7	1.5	4.4	8.2
Mauritania	0.0	6.8	19.5	7.4	25.5	23.9	0.9	14.1	16.1
Mozambique	2.8	9.7	2.4	0.6	2.3	3.6	11.1	20.2	19.5
Niger	0.0	0.8	1.4	0.7	0.6	1.5	0.0	0.3	0.4
Nigeria	0.1	6.2	9.8	0.7	0.7	0.8	0.4	3.1	3.9
Senegal	5.8	8.3	8.5	3.6	2.6	3.0	1.1	2.0	2.3
Sierra Leone	1.3	4.0	6.2	0.5	4.4	6.0	3.2	7.0	11.3
South Africa	29.8	85.6	51.3	7.3	9.1	8.7	113.5	138.8	85.9
Sudan	2.1	6.5	4.5	13.9	14.6	15.1	2.1	7.8	8.1
Tanzania	3.4	16.1	12.4	1.4	5.5	5.6	81.7	45.5	21.6
Uganda	1.2	0.2	0.5	0.1	0.1	0.2	1.5	6.4	9.3
Zaire	0.2	1.1	1.4	0.0	0.1	0.2	1.3	2.7	3.3
Zambia	2.3	15.4	11.2	0.0	0.4	0.9	3.3	9.1	11.4
Zimbabwe	36.3	70.4	69.7	1.6	3.2	4.5	65.9	67.8	80.0
<b>Africa (median)</b>	<b>1.9</b>	<b>6.4</b>	<b>7.5</b>	<b>0.5</b>	<b>0.9</b>	<b>1.3</b>	<b>3.1</b>	<b>8.4</b>	<b>10.3</b>
<b>Asia (median)</b>	<b>25.0</b>	<b>65.2</b>	<b>141.1</b>	<b>27.1</b>	<b>32.0</b>	<b>38.9</b>	<b>3.9</b>	<b>23.2</b>	<b>77.1</b>
Bangladesh	6.1	46.8	123.9	6.5	17.6	38.9	1.1	4.7	6.3
China	25.4	158.1	321.5	32.8	46.9	53.7	7.1	77.1	77.1
India	5.0	33.6	81.7	16.8	23.4	30.2	3.0	23.2	75.7
Indonesia	5.2	65.2	141.1	21.7	23.9	26.7	3.3	5.1	32.5
Korea, Rep.	155.6	389.8	519.5	55.4	63.4	72.2	0.2	12.9	480.0
Malaysia	112.2	453.0	661.9	27.1	32.0	18.7	27.6	74.3	213.6
Pakistan	3.7	54.0	100.9	60.0	73.4	82.1	3.9	48.7	140.7
Philippines	25.0	64.2	109.0	16.2	23.4	28.6	11.6	20.2	20.8
Sri Lanka	121.6	190.0	234.6	43.0	60.3	60.6	92.0	278.9	346.9
Thailand	3.0	16.7	78.8	15.8	18.3	26.9	4.5	10.9	70.7

Notes: 1. Figures refer to kg per ha of fertilizer use, percentage of irrigated land, and tractors per 10000 ha (per arable land).

Source: FAOSTAT

Table 4: Output, Land and Labour Productivity in Sub-Saharan African and Asian Agriculture, 1965-94

	labour/land		Output Land Ratio			Output Labour Ratio		
	Output	Land Ratio	1965	1980	1994	1965	1980	1994
Benin	1.3	591	682	834	1795	1155	1674	2855
Botswana	0.7	8	26	26	31	3423	2679	3207
Burkina Faso	2.2	292	266	287	558	908	686	1072
Cameroun	4.5	316	575	787	1002	1822	2647	2531
Central African Rep	1.1	186	235	351	469	1266	1686	1931
Chad	2.4	25	50	52	66	2008	1276	1288
Congo	0.6	31	56	69	91	1790	1717	1919
C'ote d'Ivoire	5.3	122	336	663	903	2762	5015	5501
Gambia	0.5	601	1493	876	1093	2485	1097	935
Ghana	6.5	170	552	606	1001	3252	2322	2940
Kenya	6.8	143	268	420	634	1872	1668	1680
Lesotho	0.4	181	170	234	316	940	2310	2351
Madagascar	6.4	97	245	330	395	2528	2429	2224
Malawi	2.3	594	777	1207	1218	1308	1410	1080
Mali	2.9	51	90	125	184	1781	1272	1520
Mauritania	1.1	9	28	30	33	3121	2247	2615
Mozambique	4.3	81	93	106	93	1148	886	653
Niger	3.1	163	240	292	298	1474	1515	1186
Nigeria	35.0	214	506	528	1128	2363	2304	4932
Senegal	4.3	172	533	338	593	3096	1325	1737
Sierra Leone	1.2	334	467	559	671	1398	1734	1695
South Africa	23.6	24	242	376	395	10255	18807	20491
Sudan	10.4	32	96	159	170	3009	3552	3167
Tanzania	9.1	153	241	363	448	1583	1686	1408
Uganda	7.0	538	1046	1120	1589	1945	1420	1773
Zaire	9.0	301	408	559	794	1353	1470	1528
Zambia	1.7	29	49	71	92	1698	1369	1213
Zimbabwe	3.4	79	177	285	366	2252	2416	2228
<b><u>Africa (median)</u></b>	<b>3</b>	<b>153</b>	<b>244</b>	<b>344</b>	<b>459</b>	<b>1847</b>	<b>1686</b>	<b>1846</b>
<b><u>Africa (mean)</u></b>	<b>6</b>	<b>198</b>	<b>355</b>	<b>416</b>	<b>587</b>	<b>2286</b>	<b>2522</b>	<b>2774</b>
<b><u>Asia (median)</u></b>	<b>29</b>	<b>900</b>	<b>1897</b>	<b>2815</b>	<b>4050</b>	<b>2455</b>	<b>3222</b>	<b>3375</b>
<b><u>Asia (mean)</u></b>	<b>86</b>	<b>1024</b>	<b>2506</b>	<b>3799</b>	<b>5426</b>	<b>2553</b>	<b>3255</b>	<b>5173</b>
Bangladesh	30.4	1637	3152	3929	5153	1925	1270	1310
China	379.0	866	1066	1355	2600	1231	1445	2511
India	278.6	851	1572	2260	3736	1847	1953	2757
Indonesia	47.6	751	1236	2186	3448	1646	2409	3047
Korea, Rep.	14.3	2343	6282	11300	18156	2681	4403	12721
Malaysia	6.7	427	1522	2694	2955	3561	6310	12488
Pakistan	39.2	426	1615	2539	4363	3794	3553	4913
Philippines	26.2	934	3508	4840	5856	3755	4768	5349
Sri Lanka	6.3	1024	2931	3946	4430	2863	3223	2928
Thailand	28.2	977	2179	2937	3559	2229	3220	3703
<b><u>t-Test for difference between the Means</u></b>		(including South Africa)	<b><u>-4.29</u></b>	<b><u>-3.78</u></b>	<b><u>-3.33</u></b>	<b><u>-0.61</u></b>	<b><u>-0.91</u></b>	<b><u>-1.64</u></b>
		(excluding South Africa)	<b><u>-4.28</u></b>	<b><u>-3.77</u></b>	<b><u>-3.33</u></b>	<b><u>-1.73</u></b>	<b><u>-2.53</u></b>	<b><u>-2.33</u></b>

Notes: Output is measured in wheat equivalent units in mn tons in 1980 world relative prices.  
Land and labour productivity are in kg per hectare and per head wheat equivalent units.  
Medians and means refer to the countries in the table. Means are simple averages.

Source: Karshenas (1998) and Table 1.

Table 5: Manufacturing Wages in Sub-Saharan Africa and Asia, 1965-94

	In U.S. Dollars at Official Exchange Rates			Consumption Wages in International Prices(1)			Real Wage Index(2)		
	1965-70	1975-80	1985-90	1965-70	1975-80	1985-90	1965-70	1975-80	1985-90
Benin	..	1985	..	..	407	..	..	..	..
Botswana	..	2727	2086	..	457	539	..	100	69
Burkina Faso	..	2659	..	..	414	..	..	..	..
Cameroun	948	3426	6097	168	381	688	76	100	81
Central African Rep	..	1951	3934	..	288	635	..	100	147
Chad	..	..	..	..	..	..	..	..	..
Congo	640	..	4122	127	..	854	57	100	116
Côte d'Ivoire	1284	3776	..	338	634	..	97	100	..
Gambia	..	855	1326	..	208	..	..	100	101
Ghana	675	1716	1138	92	107	193	186	100	95
Kenya	960	1835	1565	187	330	508	116	100	64
Lesotho	..	..	910	..	..	295	..	..	..
Madagascar	645	1477	979	189	260	262	98	100	65
Malawi	351	884	962	84	189	298	88	100	101
Mali	841	1294	..	203	227	..	159	100	..
Mauritania	..	..	..	..	..	..	..	..	..
Mozambique	533	..	..	230	..	..	..	..	..
Niger	..	5151	3445	..	547	675	..	100	70
Nigeria	700	2593	2094	82	218	344	110	100	59
Senegal	..	3254	5088	..	525	875	..	100	99
Sierra Leone	..	..	618	..	..	..	..	..	..
South Africa	1622	4175	6957	227	594	1096	75	100	111
Sudan	..	..	..	..	..	..	..	..	..
Tanzania	567	1081	546	84	128	86	165	100	34
Uganda	548	..	630	44	..	99	..	..	..
Zaire	..	..	..	..	..	..	..	..	..
Zambia	1341	2928	1692	180	309	216	103	100	39
Zimbabwe	1253	2954	3418	191	404	734	82	100	104
<b>Africa (median)</b>	<b>700</b>	<b>2593</b>	<b>1692</b>	<b>180</b>	<b>330</b>	<b>508</b>	<b>98</b>	<b>100</b>	<b>88</b>
<b>Asia (median)</b>	<b>402</b>	<b>741</b>	<b>1215</b>	<b>100</b>	<b>197</b>	<b>454</b>	<b>82</b>	<b>100</b>	<b>133</b>
Bangladesh	322	426	640	111	155	335	133	100	116
China	..	433	380	..	133	149	..	100	128
India	393	741	1215	82	177	454	89	100	133
Indonesia	139	588	827	40	112	302	62	100	165
Korea, Rep.	364	1955	7888	84	295	1065	43	100	227
Malaysia	688	1550	3180	145	274	720	94	100	150
Pakistan	411	810	1538	101	227	607	70	100	177
Philippines	647	927	1814	156	214	476	131	100	125
Sri Lanka	442	486	618	99	197	290	74	100	102
Thailand	495	1093	2268	144	280	694	84	100	125
<b>Africa (mean)</b>	<b>861</b>	<b>2459</b>	<b>2506</b>	<b>162</b>	<b>349</b>	<b>494</b>	<b>109</b>	<b>100</b>	<b>85</b>
<b>Asia (mean)</b>	<b>433</b>	<b>901</b>	<b>2037</b>	<b>107</b>	<b>206</b>	<b>509</b>	<b>87</b>	<b>100</b>	<b>145</b>
<b>t-Test for difference between the Means</b>	<b>3.95</b>	<b>4.48</b>	<b>0.53</b>	<b>2.43</b>	<b>3.21</b>	<b>-0.13</b>	<b>1.60</b>	<b>---</b>	<b>-4.15</b>

Notes: 1. Consumption wages are indices with Asia median=100, evaluated at PPP consumption exchange rate.

2. Wages deflated by consumer price index. Indices refer to period averages.

Source: UNIDO, INDSTAT 1996, World Penn Tables Mark 5.6, and World Economic Indicators, World Bank.

Table 6: Population and Road Density in Sub-Saharan Africa and Asia, 1965-94

	Population Density		Road Density		Paved Road Density		
	1965	1990	1965	1990	1970	1980	1990
Benin	22	41	59	76	..	8.1	9.4
Botswana	1	2	14	16	0.0	2.0	4.1
Burkina Faso	18	33	61	41	2.4	2.6	4.9
Cameroun	12	24	65	151	2.0	5.4	7.7
Central African Rep	3	5	34	39	0.1	0.7	0.8
Chad	3	4	24	21	2.6	0.2	0.3
Congo	3	7		28	1.1	1.6	2.9
C'te d'Ivoire	14	37	104	154	4.0	9.6	13.3
Gambia	36	82	118	320	28.2	46.2	54.9
Ghana	33	63		160	20.3	35.4	36.3
Kenya	17	40	74	118	4.5	9.8	12.1
Lesotho	32	59		153	..	9.1	17.5
Madagascar	10	20	65	87	6.0	17.4	18.1
Malawi	34	79	108	137	8.0	20.2	24.7
Mali	4	7	10	12	1.3	1.5	4.9
Mauritania	1	2		7	0.0	0.7	0.8
Mozambique	10	18		45	2.7	4.9	6.3
Niger	3	6	6	15	0.4	2.1	3.2
Nigeria	53	104	61	124	16.7	33.0	34.0
Senegal	18	37	80	78	10.9	17.9	20.8
Sierra Leone	34	58	100	120	14.4	16.8	21.1
South Africa	16	31	107	151	27.1	38.2	42.2
Sudan	5	10		4	0.1	1.3	1.4
Tanzania	12	27	18	93	3.8	3.8	4.0
Uganda	34	71	122	144	11.1	19.4	12.1
Zaire	7	16		65	0.9	1.0	1.2
Zambia	5	11	46	52	3.9	7.5	8.3
Zimbabwe	11	25	205	203	21.9	30.5	33.3
<b><u>Africa (median)</u></b>	<b><u>12</u></b>	<b><u>26</u></b>	<b><u>65</u></b>	<b><u>82</u></b>	<b><u>3.8</u></b>	<b><u>7.8</u></b>	<b><u>8.9</u></b>
<b><u>Asia (median)</u></b>	<b><u>91</u></b>	<b><u>172</u></b>	<b><u>141</u></b>	<b><u>184</u></b>	<b><u>34.4</u></b>	<b><u>62.3</u></b>	<b><u>81.2</u></b>
Bangladesh	405	751		108	27.7	32.9	50.8
China	75	119		111	..	..	..
India	151	257	286	550	109.2	209.9	255.5
Indonesia	56	94	47	147	11.6	31.2	64.3
Korea, Rep.	288	433	349	565	36.6	157.9	346.9
Malaysia	29	54	46	122	46.7	62.3	84.4
Pakistan	72	142	96	222	32.1	49.3	112.6
Philippines	107	203	187	527	52.0	92.7	74.6
Sri Lanka	170	263	312	402	..	273.9	..
Thailand	60	108	24	141	18.9	46.2	78.1

Notes: 1. Road and Paved Road Density are measured in km per thousand square km. Population density is per sq. km.

Source: World Bank, World Tables

Table 7: Growth and Variability in Cereal Yields in Sub-Saharan Africa and Asia, 1961-1996

	Yield (kg/ha)		Trend Growth Rates		Annual Variation		
	average 1961-65	average 1990-95	1961-75	1975-95	1961-71	1971-81	1981-95
Benin	5.2	9.3	2.2	1.7	6.1	8.2	10.2
Botswana	3.3	2.9	2.3	-1.0	86.7	92.4	38.4
Burkina Faso	4.7	7.9	0.5	2.4	16.5	8.9	13.3
Cameroun	7.9	12.2	1.0	2.2	6.5	10.0	8.9
Central African Rep	6.0	9.0	0.6	3.8	11.6	12.4	14.8
Chad	6.2	6.2	-0.5	0.8	15.8	16.2	21.5
Congo	8.6	9.2	-1.1	2.2	16.6	21.2	14.2
C'te d'Ivoire	7.4	10.0	1.5	1.5	9.4	11.3	10.6
Gambia	10.5	11.2	0.0	0.6	4.9	12.5	8.9
Ghana	8.0	12.2	0.6	2.8	11.9	9.5	20.5
Kenya	12.2	16.4	0.7	0.9	5.2	9.9	16.2
Lesotho	8.1	10.0	-2.3	0.1	5.6	39.4	34.1
Madagascar	17.7	19.4	0.2	0.9	4.6	4.2	3.5
Malawi	9.6	10.4	1.0	-0.9	23.0	10.5	44.2
Mali	7.3	8.0	0.8	0.1	8.6	23.8	15.8
Mauritania	3.7	7.8	-2.3	4.6	17.1	28.6	17.1
Mozambique	9.0	4.5	-1.2	-3.0	5.6	15.4	38.7
Niger	5.4	3.1	-3.4	-1.7	19.6	14.1	30.7
Nigeria	7.4	11.4	0.9	0.9	9.4	21.2	13.3
Senegal	5.7	8.1	0.5	1.4	25.2	36.7	20.0
Sierra Leone	12.0	12.0	1.7	-0.9	12.2	5.8	10.2
South Africa	10.6	17.0	3.8	-0.2	27.3	28.4	40.3
Sudan	8.2	5.5	-2.1	-1.4	20.2	14.5	37.1
Tanzania	8.4	12.6	-0.3	1.2	13.3	16.8	14.9
Uganda	9.1	15.2	2.9	0.9	10.9	15.0	18.6
Zaire	6.8	7.9	0.8	0.2	5.5	3.0	2.5
Zambia	8.0	14.6	1.9	-0.1	14.4	14.4	42.8
Zimbabwe	8.8	11.4	3.7	-1.7	20.0	28.6	67.4
<b><u>Africa (median)</u></b>	<b><u>8.0</u></b>	<b><u>10.0</u></b>	<b><u>0.7</u></b>	<b><u>0.8</u></b>	<b><u>12.0</u></b>	<b><u>14.5</u></b>	<b><u>16.7</u></b>
<b><u>Asia (median)</u></b>	<b><u>15.3</u></b>	<b><u>28.1</u></b>	<b><u>2.2</u></b>	<b><u>2.0</u></b>	<b><u>7.1</u></b>	<b><u>5.6</u></b>	<b><u>4.5</u></b>
Bangladesh	16.6	25.8	0.4	2.0	7.1	6.5	4.5
China	14.9	44.4	4.5	3.2	4.8	4.7	3.9
India	9.4	20.4	2.0	3.0	7.4	8.2	4.9
Indonesia	15.3	38.5	3.5	2.7	5.4	3.4	3.1
Korea, Rep.	30.4	58.3	2.8	1.1	10.1	14.1	8.1
Malaysia	20.9	30.1	2.2	0.7	5.4	5.6	4.1
Pakistan	8.7	18.8	4.1	1.6	7.6	3.7	6.4
Philippines	10.3	21.6	1.9	2.5	6.3	5.1	4.4
Sri Lanka	18.2	28.1	0.4	1.9	10.0	6.9	12.7
Thailand	17.8	22.7	0.7	2.0	4.9	10.4	5.6
<b>Africa (mean)</b>	<b>8.1</b>	<b>10.2</b>	<b>0.5</b>	<b>0.7</b>	<b>15.5</b>	<b>19.0</b>	<b>22.5</b>
<b>Asia (mean)</b>	<b>16.3</b>	<b>30.9</b>	<b>2.2</b>	<b>2.1</b>	<b>6.9</b>	<b>6.9</b>	<b>5.8</b>
<b>t-Test for difference between the Means</b>	<b>-3.89</b>	<b>-5.08</b>	<b>-3.03</b>	<b>-3.39</b>	<b>2.84</b>	<b>3.53</b>	<b>5.47</b>

Notes: 1. Annual variation in yields is measured as the standard deviation of annual growth rates.

Source: FAOSTAT

Table 8: Growth and Variability in Coarse Grain Yields in Sub-Saharan Africa and Asia, 1961-1996

	Yield (kg/ha)		Trend Growth Rates		Annual Variation		
	average 1961-65	average 1990-95	1961-75	1975-95	1961-71	1971-81	1981-95
Benin	5.2	9.2	2.0	1.8	6.2	8.2	10.1
Botswana	3.3	2.8	2.4	-0.9	87.9	94.3	40.5
Burkina Faso	4.7	7.8	0.4	2.5	17.1	9.3	13.6
Cameroun	7.9	11.5	1.0	2.0	7.0	10.7	10.2
Central African Rep	5.9	8.7	0.6	4.1	11.7	14.5	16.0
Chad	6.0	5.8	-0.7	0.6	15.9	17.0	20.7
Congo	9.0	9.2	-3.3	2.8	28.8	25.1	17.3
C'te d'Ivoire	6.4	7.4	-0.2	1.8	12.7	17.0	8.1
Gambia	9.5	10.6	-0.2	1.1	6.3	15.2	13.0
Ghana	7.8	11.7	0.7	2.6	13.1	9.8	22.4
Kenya	12.2	16.2	0.5	1.1	5.9	10.9	16.4
Lesotho	8.1	10.3	-1.9	0.5	7.5	39.7	32.3
Madagascar	11.5	9.2	-1.4	-0.6	7.1	7.1	7.5
Malawi	9.7	10.3	0.8	-0.8	23.4	11.3	44.9
Mali	6.9	7.1	1.0	-0.2	10.1	25.4	16.3
Mauritania	3.7	5.3	-2.8	3.3	17.5	30.8	20.1
Mozambique	8.4	4.3	-1.5	-3.1	6.5	20.4	40.8
Niger	5.3	3.0	-3.6	-1.8	20.2	15.6	32.0
Nigeria	7.3	10.7	0.7	0.8	9.2	21.8	14.6
Senegal	5.1	7.1	0.8	1.1	24.6	35.5	22.9
Sierra Leone	9.9	7.7	0.6	-2.6	4.8	5.2	9.8
South Africa	11.5	17.4	3.8	-1.0	30.8	35.4	50.7
Sudan	8.1	4.8	-2.3	-1.8	21.3	13.9	40.6
Tanzania	8.0	12.0	-0.8	1.1	13.8	18.7	16.9
Uganda	9.0	15.2	2.9	0.9	11.1	15.3	18.8
Zaire	6.7	8.0	0.9	0.4	4.8	3.6	2.7
Zambia	8.0	14.3	1.9	-0.2	14.4	14.5	45.1
Zimbabwe	8.8	10.4	3.4	-1.9	20.6	30.5	69.7
<b><u>Africa (median)</u></b>	<b><u>7.9</u></b>	<b><u>9.2</u></b>	<b><u>0.6</u></b>	<b><u>0.7</u></b>	<b><u>12.9</u></b>	<b><u>15.4</u></b>	<b><u>18.1</u></b>
<b><u>Asia (median)</u></b>	<b><u>7.6</u></b>	<b><u>14.1</u></b>	<b><u>1.4</u></b>	<b><u>2.2</u></b>	<b><u>10.4</u></b>	<b><u>7.5</u></b>	<b><u>6.9</u></b>
Bangladesh	7.1	7.1	0.1	0.3	8.7	7.4	11.0
China	11.2	40.8	4.8	3.7	7.0	6.9	6.1
India	5.3	9.2	1.4	1.8	10.5	9.0	13.1
Indonesia	9.7	21.9	1.2	3.5	7.6	2.1	2.5
Korea, Rep.	18.1	37.5	4.3	1.3	21.3	22.9	6.9
Malaysia	13.2	17.7	3.9	2.2	20.0	26.0	6.7
Pakistan	6.3	9.8	1.8	1.3	5.2	4.4	5.6
Philippines	6.6	14.1	2.3	2.9	3.6	3.3	3.6
Sri Lanka	7.2	9.5	-0.9	2.2	19.7	7.5	10.5
Thailand	19.8	26.7	0.7	3.0	10.4	24.9	9.6
<b>Africa (mean)</b>	<b>7.6</b>	<b>9.2</b>	<b>0.2</b>	<b>0.5</b>	<b>16.4</b>	<b>20.6</b>	<b>24.1</b>
<b>Asia (mean)</b>	<b>10.5</b>	<b>19.4</b>	<b>1.9</b>	<b>2.2</b>	<b>11.4</b>	<b>11.4</b>	<b>7.6</b>
<b>t-Test for difference between the Means</b>	<b>-1.68</b>	<b>-2.62</b>	<b>-2.50</b>	<b>-3.58</b>	<b>1.36</b>	<b>2.05</b>	<b>5.08</b>

Notes: 1. Annual variation in yields is measured as the standard deviation of annual growth rates.

Source: FAOSTAT

Table 9: Trends in Value Added Ratio in Sub-Saharan Africa and Asia, 1965-95

	V-Ratio (%) <sup>(1)</sup>						
	1965-66	1970-71	1975-76	1980-81	1985-86	1990-91	1994-95
Benin	17.0	13.3	17.2	25.5	27.1	34.7	40.2
Botswana	7.7	12.7	16.6	8.7	5.5	6.9	7.7
Burkina Faso	10.6	4.5	4.2	4.2	4.5	4.6	5.2
Cameroon	7.7	8.3	10.9	14.5	10.8	15.5	24.3
Central Afr. Rep.	10.0	6.6	9.0	11.1	13.2	16.9	19.7
Chad*	6.4	6.5	8.3	14.3	12.6	13.2	17.8
Congo	12.3	11.3	10.2	8.0	10.1	15.0	16.7
Cote d'Ivoire	15.4	15.2	15.8	19.5	21.5	29.4	30.3
Gambia, The	6.8	7.2	8.6	8.2	8.1	6.6	7.5
Ghana	49.6	54.1	61.7	78.8	56.2	58.6	53.9
Kenya	8.2	7.0	9.0	8.2	9.2	8.6	8.8
Lesotho	11.2	52.3	50.7	41.1	30.7	24.0	17.1
Madagascar	5.2	5.2	8.9	6.9	8.7	11.3	16.3
Malawi	7.8	6.7	6.8	6.6	5.5	5.4	7.2
Mali	..	12.7	15.4	10.4	7.3	9.6	16.5
Mauritania	5.6	7.0	10.4	16.9	17.3	25.5	26.7
Mozambique	..	..	..	10.0	16.3	12.5	11.0
Niger*	10.4	14.9	8.3	6.5	5.2	6.5	7.3
Nigeria	39.7	26.9	27.3	31.0	65.4	66.6	80.9
Senegal	7.0	6.1	9.7	5.4	7.3	8.3	9.0
Sierra Leone	12.2	12.0	20.1	19.4	42.3	37.0	43.6
South Africa	22.9	19.5	27.9	33.8	30.8	33.2	36.2
Sudan	17.3	18.7	19.6	16.7	18.7	17.6	..
Tanzania	6.8	..	..	11.6	15.2	18.2	20.5
Uganda	9.4	11.2	26.2	20.8	9.9	13.5	16.1
Zaire	5.9	5.4	8.7	13.3	19.5	..	..
Zambia	4.4	3.6	4.6	5.6	4.7	7.7	7.2
Zimbabwe*	5.6	5.5	6.7	5.8	7.8	6.6	6.8
<b>Africa (median)</b>	<b>8.8</b>	<b>9.8</b>	<b>10.3</b>	<b>11.3</b>	<b>11.7</b>	<b>13.5</b>	<b>16.6</b>
<b>Asia (median)</b>	<b>27.1</b>	<b>30.7</b>	<b>31.4</b>	<b>26.5</b>	<b>28.2</b>	<b>28.2</b>	<b>27.0</b>
Bangladesh	22.6	26.3	41.5	29.9	32.5	32.7	26.4
China	14.3	14.1	15.2	14.6	13.2	12.5	9.5
India	26.1	28.5	23.7	22.3	20.3	21.8	22.5
Indonesia	49.0	40.5	26.7	21.8	22.9	17.9	17.3
Korea, Rep.	46.3	36.9	42.3	31.5	40.1	42.0	45.3
Malaysia	28.2	33.1	43.9	40.7	49.0	59.7	51.9
Pakistan	37.6	34.1	28.6	23.1	23.9	23.7	27.5
Philippines	25.5	31.4	35.1	30.9	34.3	33.5	38.6
Sri Lanka	30.3	29.9	34.2	32.1	33.1	32.9	29.6
Thailand	11.0	8.6	12.3	12.0	9.2	8.3	7.8

Notes: (1) Value added per agricultural worker as a percentage of value added per worker in the non-agricultural sector.

Source: World Bank, World Development indicators

Table 10: Decomposition of the Trends in Value Added Ratio in Sub-Saharan Africa and Asia, 1965-95

	Trend Growth Rates in:				Trend Growth Rates in:			
	Labour Productivity			Relative Price <sup>(2)</sup>	Labour Productivity			Relative Price <sup>(2)</sup>
	V-Ratio <sup>(1)</sup>	Agricult.	Non-Agr.		V-Ratio <sup>(1)</sup>	Agricult.	Non-Agr.	
1965-80	1965-80	1965-80	1965-80	1980-95	1980-95	1980-95	1980-95	
Benin	7.2	2.2	-4.5	0.6	3.5	2.8	-2.4	-1.7
Botswana	2.5	7.7	2.3	-3.0	-0.9	3.4	2.6	-1.7
Burkina Faso	-1.3	-0.9	4.0	3.7	2.0	1.4	1.4	2.1
Cameroon	5.1	3.6	-0.5	1.1	3.9	-0.7	-3.5	1.0
Central Afr. Rep.	0.6	0.9	0.4	0.1	4.2	0.8	-3.6	-0.3
Chad	3.7	-3.9	-6.8	0.8	1.1	2.4	0.9	-0.3
Congo	-1.0	1.3	2.0	-0.3	7.1	0.9	-2.7	3.5
Cote d'Ivoire	1.2	2.8	3.4	1.8	4.5	-2.0	-3.4	3.1
Gambia, The	0.5	0.2	1.3	1.5	-2.1	-2.4	-0.9	-0.6
Ghana	4.6	-1.9	-1.8	4.7	-3.3	-1.1	1.9	-0.3
Kenya	1.4	0.9	1.8	2.4	-0.1	-0.7	-1.0	-0.4
Lesotho	-3.4	-1.2	10.4	8.2	-6.0	-2.0	3.3	-0.6
Madagascar	4.4	-1.8	-2.4	3.9	5.7	0.4	-5.6	-0.3
Malawi	0.6	1.1	0.2	-0.3	-0.2	-1.2	-0.5	0.6
Mali	-1.9	-1.6	0.5	0.2	2.5	2.5	-7.1	-7.1
Mauritania	7.3	-5.3	-6.9	5.7	3.3	2.3	-4.0	-3.0
Mozambique	..	..	..	..	1.0	0.4	-0.1	0.5
Niger	-3.1	-4.7	-2.7	-1.0	-4.6	-1.0	-10.5	-14.1
Nigeria	-1.9	1.3	3.4	0.1	5.8	3.2	-2.3	0.3
Senegal	0.6	-1.3	-1.6	0.3	3.3	-0.1	-2.0	1.4
Sierra Leone	3.9	4.8	1.2	0.3	4.3	-0.1	-3.5	0.8
South Africa	2.9	4.7	-0.7	-2.4	0.6	1.6	-2.1	-3.2
Sudan	1.8	0.4	-1.5	0.0	0.1	-2.5	-2.3	0.2
Tanzania	..	..	..	..	4.2	1.9	-2.4	-0.1
Uganda	9.8	..	..	..	4.3	1.2	-1.7	1.4
Zaire	8.9	-0.3	-4.3	4.9	3.8	0.8	-1.7	1.4
Zambia	2.5	-2.1	-3.4	1.2	3.3	-0.7	-3.1	0.9
Zimbabwe	-0.5	-1.6	-2.0	-1.0	1.1	-1.2	-1.9	0.5
<b>Africa (median)</b>	<b>1.6</b>	<b>0.2</b>	<b>-0.5</b>	<b>0.6</b>	<b>2.9</b>	<b>0.4</b>	<b>-2.2</b>	<b>0.1</b>
<b>Asia (median)</b>	<b>0.1</b>	<b>1.3</b>	<b>2.4</b>	<b>1.3</b>	<b>0.0</b>	<b>2.1</b>	<b>2.5</b>	<b>0.8</b>
Bangladesh	3.9	..	..	..	-0.1	1.2	-0.1	-1.3
China	-0.6	0.9	4.2	2.8	-3.8	3.3	8.7	1.5
India	-1.8	0.2	0.7	-1.3	0.1	2.0	2.7	0.9
Indonesia	-5.5	2.7	4.4	-3.7	-1.9	1.0	4.0	1.0
Korea, Rep.	-1.0	2.5	6.5	2.9	2.3	6.5	4.9	0.7
Malaysia	2.9	4.1	2.6	1.3	3.0	4.5	2.3	0.8
Pakistan	-3.2	-0.6	2.0	-0.6	0.5	2.3	1.8	0.0
Philippines	1.7	1.3	2.3	2.8	1.5	0.1	-2.4	-1.0
Sri Lanka	0.8	1.0	2.4	2.1	-0.3	0.5	1.9	1.0
Thailand	1.8	2.5	1.7	1.1	-3.3	2.4	4.5	-1.2

Notes: (1) Value added per agricultural worker as a percentage of value added per worker in the non-agricultural sector.

(2) Price effect is calculated as the residual of trend growth rates in other variables.

Source: World Bank, World Development indicators

Table 11: Savings Ratio and Resource Gap in Sub-Saharan Africa and Asia, 1965-94

	Saving Ratio					Resource Gap						
	1965-70	1970-74	1975-79	1980-84	1985-89	1990-94	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94
Benin	1.7	10.0	12.9	..	6.0	7.3	-9.2	-3.4	-4.9	..	-6.0	-7.9
Botswana	-8.7	18.5	9.3	19.8	30.3	30.0	-30.4	-30.3	-27.1	-15.9	6.5	-4.7
Burkina Faso	1.4	24.1	17.6	13.1	19.7	20.9	-8.2	4.1	-5.0	-4.6	-2.0	-0.6
Cameroun	11.3	10.4	14.9	15.7	17.9	13.0	-1.4	-7.1	-10.3	-9.3	-4.7	-3.0
Central African Rep	4.5	15.8	10.0	6.4	9.1	5.4	-15.3	-3.1	-1.7	-2.9	-4.1	-5.8
Chad	9.5	14.1	15.9	-3.0	2.9	-2.2	-6.6	0.2	-4.4	-7.0	-6.0	-11.0
Congo	5.0	12.5	11.5	..	23.2	4.3	-23.1	-16.9	-18.5	-1.8	0.7	-22.9
C'ite d'Ivoire	20.5	20.4	18.8	8.3	7.7	-1.3	0.3	-1.6	-7.3	-12.9	-6.0	-9.7
Gambia	0.6	1.6	6.7	15.0	16.8	24.2	-8.8	-4.8	-12.7	-6.6	-0.4	3.7
Ghana	7.1	10.7	8.7	3.9	5.8	5.9	-5.7	-0.8	-0.2	-0.9	-5.0	-8.8
Kenya	15.5	18.9	16.7	18.0	17.8	16.0	-3.0	-5.5	-6.1	-6.1	-6.6	-3.7
Lesotho	..	..	..	..	..	..	..	59.6	-0.5	17.6	-9.3	-20.2
Madagascar	2.9	5.3	5.4	4.1	9.3	4.5	-6.2	-4.2	-4.6	-6.3	-1.6	-7.2
Malawi	-0.6	11.0	16.1	8.6	6.7	1.1	-16.4	-12.8	-14.5	-11.3	-10.6	-16.2
Mali	6.6	13.3	10.3	8.3	7.1	14.8	-11.3	-3.4	-5.8	-8.1	-13.9	-8.3
Mauritania	22.9	18.4	15.8	7.2	13.4	8.9	3.1	-1.6	-18.6	-26.4	-13.7	-10.7
Mozambique	..	..	..	-5.8	-7.0	-3.5	..	..	..	-24.6	-40.1	-57.0
Niger	2.1	7.1	12.4	11.4	15.9	6.9	-6.0	-4.6	-7.1	-6.9	1.7	-0.2
Nigeria	6.8	13.9	23.9	14.2	11.4	..	-6.7	-4.9	-3.0	-3.7	-3.7	..
Senegal	5.9	13.9	11.8	-4.1	-1.3	3.2	-5.7	-4.1	-4.9	-16.5	-12.8	-10.1
Sierra Leone	8.9	11.7	2.9	3.8	2.6	-1.3	-4.4	-2.5	-10.1	-10.7	-6.9	-13.9
South Africa	26.1	24.6	25.1	23.4	23.0	16.7	-1.9	-4.2	-0.8	-5.0	3.3	0.5
Sudan	11.5	11.5	9.3	7.5	9.2	1.1	-0.7	-1.5	-7.8	-8.8	-3.2	-12.1
Tanzania	16.3	..	..	17.6	26.4	17.8	0.1	..	..	-5.1	2.5	-15.4
Uganda	12.8	11.3	6.0	-13.0	4.8	3.9	0.2	-0.4	-0.6	-20.2	-5.0	-10.9
Zaire	9.1	11.7	8.5	4.6	5.7	..	-3.1	-5.5	-7.1	-5.1	-8.1	..
Zambia	38.7	30.1	14.0	3.8	2.9	5.0	10.0	-3.3	-13.0	-13.8	-11.8	-6.5
Zimbabwe	20.4	..	19.3	15.8	22.8	18.7	1.7	..	1.7	-3.8	3.6	-5.3
<b>Africa (median)</b>	<b>8.0</b>	<b>12.9</b>	<b>12.4</b>	<b>8.3</b>	<b>9.2</b>	<b>5.9</b>	<b>-5.7</b>	<b>-3.4</b>	<b>-5.9</b>	<b>-6.9</b>	<b>-5.0</b>	<b>-8.6</b>
<b>Asia (median)</b>	<b>14.5</b>	<b>18.8</b>	<b>24.8</b>	<b>23.2</b>	<b>24.6</b>	<b>23.9</b>	<b>-3.1</b>	<b>-1.7</b>	<b>-2.4</b>	<b>-3.9</b>	<b>-1.6</b>	<b>-2.1</b>
Bangladesh	..	6.3	6.0	10.3	7.1	9.7	..	-1.7	-4.1	-4.0	-5.6	-3.5
China	..	29.1	32.7	34.7	35.3	39.1	..	0.6	0.2	0.9	-1.6	1.4
India	14.5	17.2	21.7	20.4	20.8	21.7	-2.0	-0.9	0.3	-1.8	-2.8	-1.6
Indonesia	6.5	20.1	25.8	27.3	24.7	28.6	-2.7	0.8	1.4	0.0	-3.0	-2.1
Korea, Rep.	16.2	18.8	24.8	24.2	34.6	35.6	-7.0	-6.4	-4.5	-5.7	4.0	-1.1
Malaysia	21.4	23.0	28.4	26.5	28.5	30.5	1.9	-1.9	2.4	-8.3	2.3	-5.1
Pakistan	12.0	10.4	11.9	21.3	24.6	23.9	-5.4	-4.0	-5.8	2.6	6.0	4.3
Philippines	17.1	24.5	28.0	23.2	19.4	20.1	-3.5	2.1	-3.6	-3.9	1.6	-2.7
Sri Lanka	9.1	12.9	16.0	20.7	19.2	20.0	..	-3.6	-2.4	-8.7	-3.6	-4.4
Thailand	21.6	23.5	21.7	23.2	27.9	34.1	-1.7	-1.5	-4.9	-5.8	-2.0	-7.0
<b>Africa (mean)</b>	<b>10.0</b>	<b>14.2</b>	<b>13.0</b>	<b>8.2</b>	<b>11.5</b>	<b>8.8</b>	<b>-6.1</b>	<b>-2.5</b>	<b>-7.5</b>	<b>-8.4</b>	<b>-5.8</b>	<b>-10.3</b>
<b>Asia (mean)</b>	<b>14.8</b>	<b>18.6</b>	<b>21.7</b>	<b>23.2</b>	<b>24.2</b>	<b>26.3</b>	<b>-2.9</b>	<b>-1.7</b>	<b>-2.1</b>	<b>-3.5</b>	<b>-0.5</b>	<b>-2.2</b>
<b>t-Test for difference between the Means</b>	<b>-1.94</b>	<b>-1.75</b>	<b>-3.10</b>	<b>-5.84</b>	<b>-4.08</b>	<b>-5.31</b>	<b>-1.81</b>	<b>-0.31</b>	<b>-3.50</b>	<b>-2.52</b>	<b>-2.72</b>	<b>-3.50</b>

Notes: 1. Savings ratio is national savings as a ratio of GDP. 2- Resource gap is savings ratio minus gross investment ratio.

3. Savings for Zimbabwe refers to gross domestic savings.

Source: World Bank, World Development Indicators.

Table 12: Per Capita GDP and Share of Exports in GDP in Sub-Saharan Africa and Asia, 1965-90

	Per Capita GDP						Exports as % of GDP					
	1965-69	1970-74	1975-79	1980-84	1985-89	1990-92	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94
Benin	89	88	84	88	80	74	14.1	22.2	22.7	25.8	27.2	23.6
Botswana	56	86	125	159	187	..	26.0	34.5	45.4	56.3	69.3	53.7
Burkina Faso	31	31	35	38	41	41	7.3	8.9	11.0	12.5	12.3	..
Cameroun	59	66	78	106	110	89	22.8	23.1	23.2	28.3	21.9	22.3
Central African Rep	55	58	59	51	47	44	27.3	25.1	24.5	24.5	19.2	16.2
Chad	56	51	48	32	31	33	20.4	22.6	23.0	20.1	19.7	13.7
Congo	103	135	140	192	192	181	32.3	36.1	45.5	58.3	46.3	35.3
C'ite d'Ivoire	58	66	80	67	64	63	37.1	36.6	37.9	39.1	35.8	36.6
Gambia	74	80	75	67	65	73	38.0	37.3	39.4	46.4	51.9	59.1
Ghana	58	63	67	76	92	100	18.4	19.5	12.3	6.5	15.9	18.6
Kenya	52	62	69	67	70	72	30.2	29.3	30.0	25.9	23.9	32.1
Lesotho	37	47	72	80	78	77	12.0	13.7	16.2	15.3	13.6	13.2
Madagascar	89	87	76	66	56	51	17.2	15.6	15.4	11.9	15.3	17.8
Malawi	35	39	42	41	40	41	22.8	26.0	26.8	24.4	23.5	23.1
Mali	33	34	40	41	42	41	..	12.1	12.7	18.0	17.2	17.5
Mauritania	68	71	77	70	64	64	40.7	46.5	35.9	46.2	52.5	43.7
Mozambique	110	118	85	69	61	59	..	..	..	13.5	11.7	21.1
Niger	58	56	51	52	43	..	9.7	14.1	22.8	22.4	19.6	12.2
Nigeria	47	84	110	103	77	80	10.4	14.9	22.5	18.7	26.8	35.6
Senegal	90	88	91	92	92	90	24.9	31.9	34.7	32.5	25.9	26.4
Sierra Leone	91	97	91	84	71	68	28.7	29.8	24.7	15.5	13.9	21.9
South Africa	228	272	273	277	263	252	25.2	25.3	32.1	29.3	29.2	24.0
Sudan	72	68	77	73	63	58	15.0	15.0	10.4	9.8	6.1	..
Tanzania	32	37	40	37	41	..	26.0	24.2	17.2	9.2	13.5	..
Uganda	51	51	46	61	42	44	..	..	..	12.0	8.1	6.2
Zaire	48	53	43	37	36	..	19.3	13.1	12.3	18.8	..	..
Zambia	86	93	85	72	60	55	52.5	46.0	39.9	33.7	35.9	31.3
Zimbabwe	..	98	96	101	93	95	..	4.9	28.8	25.7	30.0	34.7
<b>Africa (median)</b>	<b>58.2</b>	<b>67.1</b>	<b>76.6</b>	<b>69.3</b>	<b>64.4</b>	<b>66.1</b>	<b>23.9</b>	<b>23.6</b>	<b>23.9</b>	<b>23.4</b>	<b>21.9</b>	<b>23.4</b>
<b>Asia (median)</b>	<b>100.0</b>	<b>109.5</b>	<b>127.3</b>	<b>137.6</b>	<b>135.1</b>	<b>149.1</b>	<b>10.4</b>	<b>19.5</b>	<b>21.2</b>	<b>22.9</b>	<b>23.7</b>	<b>26.8</b>
Bangladesh	93	78	81	90	103	116	9.0	5.6	5.3	6.8	7.6	10.3
China	48	58	65	84	103	111	3.6	4.1	6.7	11.5	15.8	22.6
India	51	65	87	120	140	162	4.1	4.5	6.7	6.3	6.7	10.0
Indonesia	117	136	163	133	114	92	..	19.5	25.9	26.5	23.7	26.8
Korea, Rep.	104	158	227	286	427	552	11.7	22.3	30.5	34.8	35.5	28.8
Malaysia	144	195	253	329	343	435	41.1	40.9	50.7	53.5	65.4	81.5
Pakistan	75	75	80	92	106	112	8.3	10.2	10.5	11.9	13.2	16.3
Philippines	105	120	140	142	130	136	16.9	22.1	21.2	22.9	26.9	30.4
Sri Lanka	96	99	115	145	163	172	30.4	25.1	31.8	28.3	26.0	31.4
Thailand	104	126	155	184	231	297	16.4	17.9	20.9	22.7	29.9	36.3
<b>Africa (mean)</b>	<b>69.1</b>	<b>77.8</b>	<b>80.6</b>	<b>82.0</b>	<b>78.7</b>	<b>76.9</b>	<b>24.1</b>	<b>24.2</b>	<b>25.7</b>	<b>25.0</b>	<b>25.4</b>	<b>26.7</b>
<b>Asia (mean)</b>	<b>93.7</b>	<b>110.9</b>	<b>136.5</b>	<b>160.5</b>	<b>186.0</b>	<b>218.5</b>	<b>15.7</b>	<b>17.2</b>	<b>21.0</b>	<b>22.5</b>	<b>25.1</b>	<b>29.4</b>
<b>t-Test for difference between the Means</b>	<b>-2.11</b>	<b>-2.03</b>	<b>-2.54</b>	<b>-2.78</b>	<b>-2.88</b>	<b>-2.78</b>	<b>1.88</b>	<b>1.67</b>	<b>0.93</b>	<b>0.48</b>	<b>0.06</b>	<b>-0.41</b>

Notes: 1. Per Capita GDP is measured in 1985 world prices in US dollar, Asian median 1965-69=100.

Source: World Bank, World Development Indicators.

Table 13: Terms of Trade Effect, Manufacturing Exports and Debt Ratios in Sub-Saharan Africa and Asia, 1965-93

	Terms of Trade Effect as Percentage of Exports					Manufacturing Export Shares			Debt/GNP Ratio	Debt Service Export Ratio
	1965-70	1970-75	1975-80	1980-85	1985-93	1970-75	1980-85	1990-93	1990	1990
Benin	-0.5	-14.9	-15.9	3.8	-0.6	9.2	7.9	..	67.8	7.7
Botswana	3.1	-21.5	-9.7	-2.3	27.1	..	..	..	18.7	4.7
Burkina Faso	-6.5	-7.7	-6.0	1.2	-0.2	5.5	15.3	30.2	32.5	6.8
Cameroun	26.9	-12.1	14.9	-31.7	-32.1	9.7	5.2	13.4	56.7	19.3
Central African Rep	6.1	-6.6	17.0	-6.7	-14.5	34.5	23.3	20.8	56.0	13.3
Chad	-1.5	13.8	-2.1	13.0	2.9	6.5	7.8	..	43.2	4.5
Congo	-6.8	36.2	22.0	6.2	-48.3	20.3	5.1	12.5	201.9	35.3
C'ote d'Ivoire	19.9	-3.8	14.0	-19.6	-26.9	8.9	9.4	17.0	188.5	34.1
Gambia	3.5	-4.4	-20.0	12.5	-18.3	0.2	10.2	32.8	112.3	20.4
Ghana	35.4	-4.7	11.0	-76.4	-35.8	1.0	5.2	23.4	62.1	35.9
Kenya	-9.0	3.8	8.0	-10.5	-48.0	13.4	12.6	30.1	88.1	36.4
Lesotho	..	..	..	..	..	..	..	..	37.7	4.2
Madagascar	4.3	-1.7	4.0	2.4	-39.2	5.6	8.3	17.4	145.0	49.1
Malawi	3.4	-2.3	-18.0	3.6	-10.8	4.4	6.5	6.3	90.0	23.7
Mali	-0.6	-5.1	-2.0	10.3	2.0	11.1	7.9	1.6	101.2	11.5
Mauritania	-11.0	-18.4	-15.0	-4.2	-3.1	2.4	1.4	1.5	223.1	30.5
Mozambique	4.2	6.8	-6.9	-8.0	7.3	8.0	2.3	20.3	388.6	18.8
Niger	-4.5	-12.6	-15.0	-26.4	7.4	6.3	2.1	..	75.1	25.2
Nigeria	10.2	33.3	27.0	-7.0	-68.9	0.9	0.7	2.4	118.5	22.8
Senegal	9.0	19.6	-31.1	2.6	-0.3	16.9	15.8	21.8	68.2	20.5
Sierra Leone	4.1	-11.9	-2.0	-4.3	-16.9	58.6	37.3	27.7	149.5	7.5
South Africa	-1.5	-8.6	-14.6	-10.1	2.5	22.7	20.3	40.3	..	..
Sudan	7.3	7.6	-9.0	-10.3	-11.3	0.2	2.9	1.7	175.3	5.9
Tanzania	0.1	1.8	0.0	-14.2	-41.4	12.4	13.9	..	288.8	42.6
Uganda	15.7	-15.1	19.0	-6.3	-111.5	0.4	1.9	0.8	62.6	57.8
Zaire	39.2	-40.1	1.9	-13.2	-17.9	7.4	22.8	19.0	..	15.1
Zambia	41.7	-60.7	-4.0	-35.8	-3.8	0.5	1.4	..	240.7	15.1
Zimbabwe	-9.6	-12.4	-6.1	-23.0	-13.6	27.6	37.2	27.8	50.2	23.1
<b>Africa (median)</b>	<b>3.5</b>	<b>-5.1</b>	<b>-2.1</b>	<b>-6.7</b>	<b>-13.6</b>	<b>7.7</b>	<b>7.9</b>	<b>19.0</b>	<b>89.0</b>	<b>20.4</b>
<b>Asia (median)</b>	<b>-4.1</b>	<b>-2.4</b>	<b>1.0</b>	<b>-5.0</b>	<b>-9.1</b>	<b>43.1</b>	<b>48.1</b>	<b>72.7</b>	<b>49.3</b>	<b>23.2</b>
Bangladesh	-9.5	-25.2	7.0	4.9	-26.7	59.1	64.0	76.7	54.9	28.5
China	11.6	-2.4	4.0	-6.2	-3.1	43.1	48.1	78.7	14.8	11.5
India	-4.1	-2.8	-20.0	-5.0	7.4	48.4	56.5	72.7	27.8	30.5
Indonesia	-3.3	31.0	18.0	-1.3	-64.9	1.3	6.9	41.1	66.1	30.9
Korea, Rep.	8.8	1.8	-13.0	0.1	6.9	80.1	90.6	93.2	13.9	10.7
Malaysia	-19.2	6.9	17.0	-24.6	-19.3	12.6	23.2	60.0	39.3	10.3
Pakistan	-5.1	-2.8	-19.1	-9.3	-9.1	79.3	55.4	77.8	49.3	23.2
Philippines	13.9	2.1	-30.9	-17.5	10.7	13.0	47.0	70.9	68.7	27.2
Sri Lanka	-19.2	-4.4	1.0	-1.5	-16.9	5.9	23.0	63.6	73.3	14.0
Thailand	-11.6	3.9	-10.0	-23.4	1.6	13.1	33.5	66.2	33.4	16.9
<b>Africa (mean)</b>	<b>6.8</b>	<b>-5.3</b>	<b>-1.4</b>	<b>-9.4</b>	<b>-19.0</b>	<b>11.3</b>	<b>10.9</b>	<b>17.6</b>	<b>120.9</b>	<b>21.9</b>
<b>Asia (mean)</b>	<b>-3.8</b>	<b>0.8</b>	<b>-4.6</b>	<b>-8.4</b>	<b>-11.3</b>	<b>35.6</b>	<b>44.8</b>	<b>70.1</b>	<b>44.1</b>	<b>20.4</b>
<b>t-Test for difference between the Means</b>	<b>2.28</b>	<b>-1.08</b>	<b>0.54</b>	<b>-0.22</b>	<b>-0.87</b>	<b>-2.44</b>	<b>-4.26</b>	<b>-9.87</b>	<b>4.28</b>	<b>0.41</b>

Notes: 1. Terms of Trade Effect is measured as  $X(1/p_m - 1/p_x)$  where X is the value of terminal year exports and

$p_m$  and  $p_x$  are import and export price indexes. The values shown are % of terminal year exports.

Source: World Bank, World Development Indicators.

Figure 1: Real Wage and Real GDP per Worker Indices for Sub-Saharan Africa and Asia, 1966-1992

