

WIDER WORKING PAPERS

Sectoral Balance: A Survey

Amitava Krishna Dutt

WP 56

March 1989

*World Institute for Development Economics Research
of the United Nations University*

SECTORAL BALANCE: A SURVEY

Amitava Krishna Dutt*

Department of Economics
University of Notre Dame
Notre Dame, Indiana 46556

Revised, October 1988

* Prepared for a World Institute of Development Economics Research (WIDER) project. I am grateful to Lance Taylor for discussions and for his comments on an earlier draft, to participants of a WIDER conference at Helsinki in August 9-11, 1988 (especially to Mihir Rakshit), and to WIDER for support.

1. Introduction

While much of development economics takes an aggregative view (focusing on capital accumulation or the growth of other resources), or a sectoral view (examining in detail one sector of the economy such as agriculture), a third perspective focuses on the interaction between sectors, examining relative changes in their importance and showing how development can be constrained by the lack of balance between the different sectors. The purpose of this paper is to survey the literature in development economics which deals with the third approach, that is, which focuses on the 'balance' between 'sectors' with a view to understanding how the lack of balance can result in development problems. At the outset, however, we need to clarify the meaning of the two terms.

While we can divide the economy into sectors simply because they produce different products, complicating the analysis in this way may not be worthwhile unless the products are in some sense significantly different from each other. Several such sources of difference have been emphasized in the literature. One, how they are used: for consumption, investment or intermediate use. Two, different consumption goods according different income and price elasticities of demand, and different patterns of consumptions by different groups of consumers; the fact that different consumption goods fulfill different needs sometimes provides enough reason to distinguish them. Three, differences in technical production conditions which may refer to differences in factors of production,¹ factor intensities, scale economies and rates of productivity growth.² Four, differences in the technological implications of production: some sectors more than others may result in learning and spilloff effects to other sectors. Five, whether they are produced or provided by nature. Six, institutional differences in production characteristics, such as whether they are produced in competitive,

oligopolistic or monopolistic environments. Seven, whether they are tradable or nontradable, and in the first category, whether they are imports or exports. In addition to these distinctions there may be others which do not necessarily involve the physical product differences between different sectors, although they might. First, there may be additional institutional differences, such as capitalist versus peasant sectors. Second, regional distinctions may be made to take account of spatial factors.³ These distinctions, together with others, may be highlighted to examine changes in income distribution between sectors even without any other significant differences between the sectors. Thus sectors can be distinguished for theoretical purposes in several different ways, although there may be practical difficulties involved in pigeon-holing a specific product into one category by any of the criteria. Which criteria one chooses to emphasize obviously depends on the type of economy and the nature of the issue with which one is concerned.

It is far more difficult to precisely define the concept of balance between these sectors, since there is no consensus on what is meant by it.⁴ In theoretical modelling the term usually refers to a path on which different sectors grow at the same rate. While this concept is important as a theoretical tool in the examination of long-run equilibrium dynamics, it is too narrow for studying the growth problems of actual economies in which structural changes are of great importance, and where there is no reason to believe that this type of balance is in some sense good for development. A second notion could consider observed patterns (of sectoral proportions) followed by actual economies in the course of their development and take some average pattern to signify balance, so that departures from it could be interpreted as the lack of balance. Structural differences between economies, and the fact that observed tendencies do not

necessarily have normative implications, imply that we cannot take this notion too seriously either,⁶ even though we could interpret 'large' deviations from average tendencies to reveal signs of development problems due, perhaps, to the failure to take advantage of reallocation effects which have been stressed in the literature on sectoral change (see below). A third notion of balance could be that which maximizes some social objective relating to development. This notion, borrowed from planning models, comes closest to what we require for understanding how the nature of sectoral interactions can help or hurt development processes, but to operationalize it we need to define a social objective function, and also have complete knowledge of the structural characteristics and laws of motion of the economy. While these different notions all have some advantages, they underscore the problems associated with attempting to define the concept precisely. For our purposes, therefore, we will define 'balance' loosely to mean the relationship between different sectors that does not hamper, in a serious manner, the development (which may be included to incorporate growth, distributional and other concerns) of a particular economy. Thus sectoral imbalance - reflected by the inadequate or 'excessive' growth of some sector(s) of the economy - may be seen as a constraint, or at least a mechanism through which particular factors acts as a constraint, on development.

The many possible notions of sectors we have mentioned and our loose definition of balance imply that our subject-matter includes virtually all multi-sector analyses of LDCs. The literature on this subject is enormous and theoretical concern on the subject dates at least as far back as Quesnay (1758). To keep the length of this survey within manageable bounds we will confine its scope in several ways. First, it will deal primarily with theoretical matters, confining empirical issues and specific policy matters to a few interspersed remarks.⁷

Second, it will largely confine attention to LDCs: contributions to the more general literature will be considered very selectively. Third, since our interest lies in understanding constraints on development, we will emphasize medium- and long-run issues rather than short-run ones, although to the extent that these issues are linked, the latter will not be excluded entirely.* Finally, we will confine our attention to balance between sectors producing goods and services in the usual sense; we thus will not enter into the important issues concerning the balance between real and financial sectors, which raise issues in financial and monetary economics the discussion of which would take us too far afield.

The rest of this paper proceeds as follows. Section 2 reviews some stylized facts, theoretical approaches and planning models, by way of providing background. Section 3 examines one of the first debates concerning balance in development economics: the concept of balanced growth. Here the question posed is whether or not an LDC must have balanced growth (in a specific sense to be discussed later) if it needs to grow at all. Most of the discussion in the development literature, however, is regarding the actual interaction between sectors, and not about a hypothetical policy issue. The more popular questions concern some stagnant sector dragging the rest of the economy back, or some rapidly-growing sector pulling the economy forward, or some rapidly growing sector retarding the economy's growth. In principle these issues could be studied in a many-sector framework, but to keep the analysis simple - and following tradition in the literature - we will consider two sectors at a time. Thus section 4 considers the agriculture-manufacturing interaction, section 5 the examines interaction between consumption and investment good sectors, section 6 discusses some two-sector issues in the open economy literature; section 7

considers luxury-wage good theories; and section 8 discusses a collection of similar but different sectoral divisions: between services and goods, between market and nonmarket sectors, and between productive and unproductive activities.⁹

2. Stylized facts, theoretical approaches, and planning tools

This section discusses, very briefly, three topics related to the problem of sectoral balance in development economics: some 'stylized' facts, theoretical models, and planning tools. We do this partly to provide a background to the subsequent discussion in order to make this paper reasonably self-contained (this is the justification for the discussion of stylized facts on aggregates and one-sector models), and partly because of their direct relevance to the question of sectoral balance (as is obvious from our unsuccessful attempt to make precise the notion of balance). Our purpose here is not to provide exhaustive surveys of each topic - each would require at least a separate paper - but to provide a very high-flying bird's eye view.

2.1 Stylized facts

The literature on 'stylized facts' [see Kaldor (1985)] is immense; we mention as few facts relating to aggregates and sectoral issues, and discuss some explanations of changes in sectoral proportions.¹⁰ Regarding aggregates we note the following.

(1) Middle income countries have faster rates of growth than countries with low or high income levels; Syrquin (1986) has found this to be the case since the 1950s.

(2) Capital formation - both saving and investment - rates [at current prices, although Syrquin (1988) argues that these tendencies are valid for constant

prices as well] tend to increase with per capita income in most countries and across them, with a few exceptions [see Kuznets (1966), Crafts (1984), Syrquin and Chenery (1986), and Syrquin (1988)]; this is consistent with Houthakker's (1965) findings regarding personal saving rates.

(3) The relation between income inequality and per capita income is inverse-U-shaped; this was first conjectured by Kuznets (1955), and confirmed weakly by subsequent cross-section studies. The evidence is not quite clear: Fields (1980) finds it not to be corroborated for some of the countries in which time series data is available, while Adelman and Robinson (1988) find that the evidence does support it.

(4) The importance of international trade in an economy does not bear any systematic relationship to per capita income; it is negatively associated with the size of the economy, usually measured by population size [see Perkins and Syrquin (1988)].

On sectoral issues, the main stylized facts refer to sectoral transformation in terms of the three broad sectors - as defined by Fisher (1939) - but cover other points as well.¹¹

(1) Increases in per capita income are associated with declines in the share of value added in agriculture, increases for manufacturing, and rough constancy and then increases for services.

(2) Similar tendencies are found in shares of employment [see Clark (1940)]. The decline in the agricultural labour share exceeded that in value added in the now developed countries due to relatively higher productivity increases in agriculture [see Timmer (1988)]; this behavior seems not to be replicated in developing countries, where relative productivity in agriculture seems to be falling [see Caballero and Rao (1988)].

(3) Similar tendencies are also found for shares in capital use, although the shifts are less marked than for labour.

(4) Not all countries tend to have similar structural changes as described in (1) through (3), both regarding timing (in terms of per capita income level) and strength of shifts. Several different categories have been noted, including differences in natural resource endowments, and size in terms of population. [See Chenery and Taylor (1968), Adelman and Morris (1984), and Ranis (1984)].

(5) Changes are observed within the three basic categories as well: Hoffman (1958) found that with industrialization the ratio of consumer to producer goods within the industrial sector falls from 4 to 1 about 1 to 1 or less. Similar shifts have been observed by Chenery and Taylor (1968) in terms of their classification of industries as early, middle and late branches.

(6) Proportions of income spent on different types of final products changes with per capita income. The most widely-noted fact is Engel's law referring to the decline in the importance of food products in the aggregate consumption basket; Houthakker (1957) demonstrated its universality, and the law has been corroborated by numerous studies since then.

(7) The nature of intermediate use of goods changes systematically with development: the general use of intermediates goes up, agriculture tends to use more intermediate inputs from outside the sector, and the relative use of primary products as intermediates goes down with heavy industry and services rising instead.

(8) Changes in the composition of trade are also observed. For LDCs the importance of agricultural exports goes down with per capita income and that for manufactured goods goes up; the importance of capital goods imports also increases [McCarthy, Taylor and Talati (1987)]. The experience of developed

countries shows that light industries tend to be exported initially, followed by heavy industry exports. In trade patterns too, different types of economies (with differences due to size, natural resource availability and policies) have different patterns.

(9) Productivity tends to grow at different rates in the three broad sectors. The rate of productivity increase in services, while difficult to measure, is much slower than elsewhere. Agricultural productivity is initially low but later increases relative to the rest of the economy; as remarked earlier, however, this does not seem to be occurring now in developing countries [see Caballero and Rao (1988)]. Kuznets (1971) showed that difference in indexes of productivity show narrowing in the early stages of development, but Rothschild (1986) finds that cross-sectoral labour productivity differentials has widened in the US.

(10) Changes in relative prices also occur with per capita income changes. Gerschenkron (1951) found increases in the relative price of primary commodities as the share of that sector in total production declines, but a general association has not been established subsequently. Increases in per capita income, however, have been found to be associated with increases in the relative price of non-traded goods and services, which have led to the use of purchasing-power parities as conversion factors.

Turning to explanations of shifts in sectoral composition, several different methods have been used. First, casual arguments (the lower technological ability of low income LDCs prevents them from producing and exporting sophisticated manufactured goods) relating one set of facts to others (Engel elasticities to the importance of agriculture). Second, theoretical models focusing on a few factors such as income elasticities of demand and differential productivity growth. For example, Simon (1947) examined a two-sector agriculture-industry

model to show that with a higher income elasticity of demand for manufactured goods the increase in productivity in manufacturing should not greatly exceed that in agriculture to allow for the observed labour shift away from the latter, and Rowthorn and Wells (1987) have considered a three-sector model adding the service sector which experiences a slower rate of productivity increase than the others and for which demand is a constant fraction of total output (they also assume an income inelastic demand for food) to explain observed trends in labour shares for all three sectors.¹² The most ambitious method is to use simulation models which can introduce a large variety of factors. Accounting for structural changes has been done both from the demand side, which examines the uses of the output of sectors and from the supply side, which looks at sectoral factor use changes and productivity shifts. Changes on the demand side show that intersectoral shifts in output from agriculture to manufacturing are initially due to Engel effects, and later due to trade effects (shift towards manufacturing import substitution followed by export expansion); input-output ratios reveal their effects throughout. Changes in the supply side show the effects of relative changes in labour productivity, and reveal the importance of the effect of reallocation of resources on the overall rate of productivity growth; this tends to be greater in the middle-income range when sectoral productivity differentials are greatest.

2.2 Theoretical models

To provide a background to the structure of different models surveyed later in the paper it is useful to provide a general overview of the structure of these different models in their simplest form - one-sector economies.

To fix ideas, consider an economy which produces one good which can be both consumed and invested, with two homogeneous factors of production, capital (the

produced good) and labour, with a fixed coefficients constant-returns-to scale production function (a simplifying assumption). Assume away open-economy and asset market complications, technological change, depreciation, and government activity. Assume that the economy is capitalist, and that there are two classes: workers who work, and consume all their income, and capitalists, who save a constant fraction, s , of their income, and earn only profit income.¹³ Since total output can either be consumed or invested, we have

$$1 = Ca_0 + g(K/X)$$

where a_0 is the technologically fixed labour-output ratio, C the consumption per employed worker, X the level of output, K the stock of capital and g its rate of growth. Since income can either go to workers or capitalists,

$$1 = (W/P)a_0 + r(K/X)$$

where W is the money wage, P the price level, and r the rate of profit. We need to assume that $K/X \geq a_1$, where a_1 is the technologically required capital-output ratio, and where the strict inequality implies excess capacity. Finally, our saving assumption implies

$$g = sr$$

These equations are not in themselves sufficient to solve for the variables of economy, C , g , W/P , r and K/X ; we need two more equations. To differentiate alternative constraints on the growth and development of economies, we distinguish between four alternative 'closures', as follows.¹⁴ (1) The neoclassical model assumes full employment growth, so that g is determined by the exogenously fixed rate of growth of labour supply, n , and output at full capacity, so that $K/X = a_1$. Thus this model takes growth to be constrained by conditions of labour supply; in a more general model, with technological change, the rate of growth of labour productivity would also be a constraint on the rate

of growth.¹⁵ (2) The neo-Marxian model takes the real wage (W/P) to be fixed exogenously, perhaps by class-struggle forces; this, too, assumes full capacity. In this model, therefore, capital accumulation is the major determinant of growth, with this accumulation determined by saving, which is in turn determined by the distribution of income; the existence of a reserve army allows the real wage to be fixed. (3) A neo-Keynesian model introduces a desired accumulation function of the form $g = g(r)$ and also assumes full capacity utilization; it also assumes unemployment, so that capital accumulation also constraints growth. However, the rate of capital accumulation is determined in this model by demand (desired accumulation and consumption) rather than the availability of saving. (4) Finally, a Kalecki-Steindl closure introduces a markup-pricing equation,

$$P = a_0 W (1+z)$$

where z is the markup rate given by the degree of monopoly, a_0 la Kalecki (1971) and a desired accumulation function $g = g(r, X/K)$ with both partials positive. In this model firms fix the price (for a given wage) and maintain excess capacity, adjusting capacity utilization in response to changes in demand; higher capacity utilization in turn makes them want to invest at a higher rate. In this model, too, desired accumulation and demand play the crucial role. It also implies that an unequal distribution of income, by depressing the market for consumption goods and hence, investment goods, reduces the rate of growth; a lower markup would increase the growth rate.¹⁶

We next discuss some general multisectoral models which also serve as background for the more specific models - addressing specific issues regarding intersectoral interaction - to be considered. The evolution of explicit multisector models dates back to Quesnay (1758) and Ricardo (1817) who emphasized agriculture-nonagriculture distinctions. Subsequently, Marx (1894) examined a

three-sector model with the sectors producing wage goods, luxury goods and the means of production. The modern analysis of multisector models was developed by von Neumann (1945-46), Leontief (1941, 1953), and Sraffa (1960), who examined the interaction of sectors in general, rather than specifying exactly which sectors were being distinguished.¹⁷

Von Neumann (1945-46) considered an economic system in which technology is represented by a finite number of production processes, each requiring some physical inputs and producing some physical outputs, where joint production is possible, where labour is treated like a commodity requiring (subsistence) consumption goods for inputs for its production. Assuming all surplus production goes to profits and is accumulated, his problem was to find a set of techniques at which balanced growth (all scarce goods output growing at the same rate) occurs at the fastest rate. Leontief (1941, 1953) also examined an input-output economy, but ruled out joint production and assumed fixed coefficients of production. The Leontief models come in several forms (see below),¹⁸ but in the closed dynamic model labour requires a consumption bundle as in the von Neumann model, and sectors require the output of other sectors both as flows (intermediate goods) and stocks (capital goods). The relative stability of this system has been examined, by which is meant whether given arbitrary positive initial stocks whether a balanced growth path will eventually be established in the system. Finally, Sraffa (1960) considered an input-output system as well, but focussed on the prices side, assuming output levels, the rate of profit (or alternatively, the real wage) and techniques of production are given and examined the determination of prices at which the rate of profit is equalized intersectorally. While Sraffa did not examine the quantities side, a growth model has been appended to his system (see Mainwaring (1984) and Marglin (1984), for

example] introducing constant returns to scale, in which balanced growth is assumed as a dual to the equal profits assumption in the price system.

This account shows the theoretical importance of a long-run equilibrium with balanced growth. However, balanced growth models have been seen mainly as a theoretical construction and a benchmark, rather than as a replication of the behaviour of actual economies. First, it is not clear that given certain behavioural assumptions an economy will actually converge to a balanced growth path even given fixed technology and consumption baskets; this stability question has been asked of the dynamic Leontief model referred to above, and it has been found that in many versions of the model the stability of both quantity and a dual price system cannot be satisfied simultaneously, a result that has come to be known as the dual instability theorem.¹⁹ Second, balanced growth is possible only under certain stringent assumptions about the nature of technological change and sectoral demand patterns. Pasinetti (1981) has examined a dynamic input-output model in which productivity and demand change at non-uniform rates between sectors, which create the possibilities of crises and unemployment and results in unbalanced growth (between sectors).

2.3 Planning tools

We can do little more here than mention some planning tools emphasizing intersectoral interactions.²⁰ While aggregative planning models examine how projections of future growth may be made on the basis of the knowledge of some key macroeconomic parameters (such as those discussed in the theoretical one-sector models), and how desired growth and income distributional patterns can be achieved by controlling the values of these parameters, the multisector models examine the structure of the economy in more detail by paying attention to sectoral growth patterns and the interaction between sectors.

The simplest multisectoral models are the static Leontief models which allow the calculation of sectoral gross output levels from the knowledge of final sectoral demands and an interindustry input-output coefficients matrix. With projections of the time path of the final demand vector (perhaps incorporating some ideas of a desirable path) and assuming a given input-output matrix, the time path of the gross outputs can be found (with some assumptions about the technology matrix); the economy can then be made to produce the output of each good according to the paths solved from the model, to prevent shortages and excess production from occurring. Various extensions of the basic model have been considered to introduce primary resource constraints of labour (perhaps distinguished according to skills), capital stocks, foreign exchange, and natural resources which make these grow at exogenously fixed rates (of perhaps zero in some cases) and input output ratios for their use can be incorporated into the analysis to make sure that the time paths of final demands are feasible, changes in input-output ratios are introduced to allow for factor substitution and technological change, non-competitive imports are introduced into the analysis. Instead of having exogenously specified consumption paths in the final demand vector, the open model can be closed by postulating consumption spending propensities of income earners, perhaps differentiating between these propensities for different income groups and functional categories (see Clark (1975) for example).

While the static models do not endogenize the link between final investment demand and the stocks of capital, dynamic Leontief models take this link into account by introducing a capital requirements coefficient matrix and an investment function for each sector, and tracking the composition of capital in each sector. A simple accelerator theory of investment, relating investment to

changes in sectoral output levels, is usually assumed, and the depreciation of capital and its replacement are incorporated into the analysis. Initial and terminal stock conditions are also introduced to relate successive plan periods to each other.

The models described so far can examine the consistency of the levels of output of each sector in relation to each other and to primary resource constraints, capital, and specified patterns of final demand, by they do not allow us to choose the 'best' patterns of final demand and resource allocation. Models which can allow such choice are optimizing models which require the specification of some objective function which is to be optimized. Static linear programming models maximize some linear objective function of (say) consumption levels of different goods, taking into account the various resource constraints, interindustry flows, and terminal capital stocks, for one time period. Dynamic linear programming models consider a sequence of such problems, taking into account intertemporal consistency of capital stocks as well, introducing an objective constraint that weights consumption at different points in time. More general dynamic optimal control models introduce non-linearities in objective functions and production relations.

A final set of models are multisectoral computable analogues of the one sector theoretical models discussed above, which introduce inter-industry flows of intermediate goods into the picture (this is achieved by building them around as social accounting matrix), and pay careful attention to the pricing and output decision of firms and the consumption decisions of individuals, relevant parameter values being taken to represent the economy being modelled. The actual model constructed will depend on the type of closing rule or rules assumed to be relevant for the economy. Short-run, static models, with given capital stocks

are the most popular, since they are relatively easier to construct. The first models of this kind were the computable general equilibrium models with neoclassical characteristics; they include production functions, utility functions, and allow prices to clear markets competitively in a Walrasian manner; all prices and quantities and prices could be solved in equilibrium.²¹ Other types of models have been constructed using different types of closures, introducing markup-pricing equations and quantity clearing in some sectors and class differences in spending patterns, as in the Kalecki-Steindl model, or introducing class-conflict-determination of income distribution, as in the neo-Marxian model.²² Once the equilibrium solutions of these models are computed, they are used to examine the implications of various types of policy changes.²³ Dynamic models which give such careful attention to institutional detail are rare, and they are either simple ones considering only a few sectors (see Kelley, Williamson and Cheetham (1972)), or examine broad structural changes (like the simulation models of structural change referred to above; see also Chenery, Robinson and Syrquin (1986)), or are very similar to the dynamic input-output models. Such models are difficult to construct because investment behaviour is perhaps the least understood of economic behaviour.

3. The Debate on Balanced Growth

One of the earliest generalizations that emerged in development economics was the so-called doctrine of balanced growth,²⁴ the historical development of which has been sketched by Dagnino-Pastore (1963). We examine this doctrine by following Mathur (1966) in distinguishing between three different - though related- concepts that emerged in the literature, as follows.

(1) Existence of complementarities in consumption demand. In an economy with a low level of income and production, an individual investor may not want to expand capacity in a single sector because of the low level of demand in the economy since by this expansion the investor could not expect all this demand to be for his product since individuals tend to be generalists in consumption. However, Rosenstein-Rodan (1943) and Nurkse (1953) argued if there was a simultaneous expansion of several sectors, the expansion of income and employment in different sectors would create the demand for all the sectors, finding markets for all the goods and making all the investment worthwhile. We thus have a case of Say's law in the sense that supply creates its own demand, provided that the expansion in supply is balanced.²⁵ This type of a low-level equilibrium implied a market failure which could not arise in a perfectly Walrasian economy. A formalization by Basu (1984) makes imperfect competition the culprit,²⁶ while earlier discussions by Rosenstein-Rodan (1951) stressed indivisibilities and increasing returns; Weitzman's (1982) model of increasing returns and monopolistic competition can formalize this.

(2) Matching supply and demand for all industries. The supply of all goods must expand at the same rate as the demand for them, so that bottlenecks do not retard the overall rate of growth. Lewis (1955) expressed this by saying that balance required that expansion in each line of production should be in keeping with its income elasticity of demand;²⁷ otherwise the terms of trade would move against some sector, reducing accumulation and technological change in it. Taking account of intermediate and capital goods complicates matters somewhat since the growth of each sector would have to be determined according to an input-output model, which takes into account the effects of changes in scale. Clearly, if sectors do not grow according to this criterion, there will be

shortages in certain sectors and excess production or capacity in others (see Scitovsky (1959) for example). The economy will respond to these changes by reduced production in some sectors or changes in prices, or both, and this, it was argued, would adversely affect the growth of the economy.

(3) Existence of external effects. Private entrepreneurs in one sector, unable to foresee the full extent by which their investments may benefit entrepreneurs in other sectors through external effects, would be deterred from many kinds of investments which, undertaken or at least planned together, would become profitable. Thus the free market cannot be an adequate mechanism for allocating resources for growth in a less developed economy, and some form of centralized coordination of investment decisions covering a large number of sectors is required. These ideas were initially presented by Young (1928) who perceived economies of scale to be primarily external to the firms, and even industries. They were subsequently discussed by Rosenstein-Rodan (1943, 1951) who recommended the internalization of the externalities by a sufficiently large investment unit. Scitovsky (1954) further elucidated the nature of these externalities, Chenery (1959) provided a formalization with a model showing the interdependence of investment decisions, and Nath (1962) found this to be the fundamental case for balanced growth.

Critics of the doctrine of balanced growth - in the various forms just described - have pointed out, however, that balanced growth is impossible in underdeveloped economies, that it is unnecessary, or that even if it is possible it is undesirable. Some have instead argued in favour of unbalanced growth, a policy of deliberately creating sectoral imbalances in the economy in order to hasten the pace of development. We examine and assess these criticisms briefly.²⁰

(1) Resource constraints. Balanced growth in the sense of Rosenstein-Rodan and Nurkse required the simultaneous establishment of a large number of industries, but this, as Furtardo (1954) and Singer (1958) pointed out overlooks the problem of the shortage of resources. The shortages of several resources have been noted, including labour (Fleming, 1955), capital (Fleming, 1955, Singer, 1958), and entrepreneurial and managerial ability (Bauer and Yamey, 1957, Kindleberger, 1958, Hirschman, 1958). Fleming (1955) discussed the effects of resource constraints in terms of the concept of externalities, which was central to the third notion of balanced growth discussed above: while the supporters of balanced growth emphasized positive pecuniary external effects, they did not take into account the negative pecuniary external effect which increase costs due to the fact that industries compete for (possibly fixed) resources. He emphasized more the externalities that worked vertically between industries at different stages of production.

Note that this criticism applies only the first version of the balanced growth argument, the others taking supply factors into account as well. Moreover, Nurkse and the others did point out that their notion only attacked the demand side and not the supply side of the problem which involved the question of resources and could be considered a complete solution only under exceptional circumstances [when capital could be borrowed from abroad as in the case of Rosenstein-Rodan (1943) and when surplus labour existed, as in the case of Rosenstein-Rodan (1943) and Nurkse (1953)]. The problem with this view is that it reduces the importance and applicability of the balanced growth argument. To defend the demand version of balanced growth one would have to argue that the emphasis on resources given in the discussion of problems of LDCs is misplaced

because that they usually have excess supplied of labour and capital, and if capital is scarce it is because of the absence of investment incentives.²⁹

(2) Availability of information. Balanced growth required information on income elasticities of demand, elasticities of supplies, technological relations, all kinds of externalities. Not only was this type of information not available in LDCs, but that in a changing, dynamic world, it is impossible to ever know about all the changing elasticities, technical coefficients and externalities. Streeten (1964) emphasizes this point and argues that unbalanced advance could improve knowledge about likely bottlenecks and how to deal with them, so that by 'probing' with unbalanced expansion here and there, private individuals (and planners) can learn more about the economic environment, rather than making big mistakes with a big push balanced growth strategy [see also Bhatt (1965)]. This argument has some similarities with one that arose in connection with socialist planning, but it is not obvious to what extent it is relevant here. Balanced growth need not require exact information about the parameters noted above, but rough a priori judgements; unbalanced growth, to the extent that it was designed to successful would also have similar information requirements (see below).

(3) Open economy considerations. It may be argued that it is unnecessary for a variety of industries to be established to build markets for each other, or to make domestic production grow in line with domestic demand, in an open economy, since foreign markets always exist for domestic products, and since shortages and surpluses can always be traded.³⁰

The main proponents of balanced growth [see Rosenstein-Rodan (1951), for example], however, were cognizant of the fact the possibilities of trading reduced the extent of balance required. What many pointed to, however, were the problems LDCs faced in world trade due to declining terms of trade [see Nurkse

(1952, 1953)], especially, as Lewis (1955) argued, in the absence of productivity increases in agriculture.

(4) Benefits of specialization. Balanced growth within an economy implied that the supply of all goods had to be expanded commensurate with its demand so that, as Scitovsky (1959) pointed out, economies could not specialize in their more productive industries, along the lines of Ricardo's theory of comparative advantage in international trade.

The answer to this critique is that comparative advantage is not a given but evolves with time [see Nurkse (1957)], depending perhaps on the economy's pattern of specialization. The problem had already been noted by Hamilton (1791) in the United States and List (1841) in Germany: if these countries did not protect their industrial sectors they would be denied the benefits of technological change and doomed to specialization in commodities which did not generate technological change. These arguments have been revived, in other contexts, by Galtung (1971) and Singer (1950), and formalized in Dutt (1986a). The central idea is that more developed countries have comparative advantage in the production of those products which have more potential for generating technological change due to learning - which may have spinoff effects on other sectors as well, so that specialization according to comparative advantage would thus slow down technical change in LDCs compared to what would happen under autarky; balanced autarkic growth could be preferable. Of course, this does not imply that LDCs may not end up protecting inefficient industries in the name of balance and be doing themselves more harm than good.²¹

(5) Economies of scale. Scitovsky (1959) and Streeten (1959) have argued that since balanced growth implies that capital and other resources are spread too thinly over a variety of industries, it cannot reap the advantages of (internal)

economies of scale and more rapid technical change due to learning - a dynamic form of scale economies. Moreover, production to avoid excess capacity, as required by the second notion of balance growth, may also have to be sacrificed to take advantage of economies of scale. However, balanced growth proponents can counter that unbalanced expansion without demand would result in excess capacities and slow down growth, the realization of scale economies, and technological change; that they made exceptions to their rule for the case of overheads anyway (see below); that their arguments did not imply producing a little of everything [see Nurkse (1957) and Mathur (1966)]; and that they did emphasize economies of scale and thus wanted a big push [see Rosenstein-Rodan (1943)].

(6) Benefits of linkage effects. Hirschman (1958) argued that surpluses and shortages could bring into play appropriate responses by private individuals (driven by the profit motive) and state officials (in response to private pressures) which could speed up growth. In his support of unbalanced growth he emphasized externalities and backward and forward linkage effects, referring to the pressures created on input supplying and output using industries, of the unbalanced expansion of one industry. Similar arguments have been made by Scitovsky (1959) and Streeten (1959), who stress the importance of shortages in generating technological change. The point of these arguments is that certain types of shortages and surpluses may be growth-promoting, and one may even try to locate, using input-output tables, where strong backward and forward linkages happen to be [see Hirschman (1958), Yotopoulos and Nugent (1976)]. However, these exercises would not be able to tell us about the ability of different sectors to provide the appropriate responses: in some cases shortages can result in the development of new techniques, but in others it could lead to complete

chaos.³² Mathur (1966) has stressed the need to distinguish - on a priori grounds - between different types of shortages according to their growth-promoting responses.

(7) Role of social overhead capital. Balanced expansion to prevent excess capacity may be inadvisable in the case of infrastructure, or social overhead capital on account of economies of scale, lumpiness, and long gestation lags. Rosenstein-Rodan (1951) and Nurkse (1957), however, have admitted that the provision of such capital is an exception to the principle of balanced growth and approved of their unbalanced expansion under conditions prevailing in LDCs.³³

(8) Superimposition of a new system on an old one. Singer (1958) argued that balanced growth implies the superimposition of modern industry on a backward economy, and Hirschman (1958) feared the creation of a modern, advanced sector with few links with a backward sector which would be bypassed by growth with dire consequences for income distribution. While a picture of superimposition may be obtained from the work of Rosenstein-Rodan and Nurkse, it does not appear to be present in others which simply focus on the removal of shortages and surpluses in the economy as a whole, and even the superimpositionist position does not necessarily imply that the existing backward economy will be left in isolation; trickle-down as in Lewis's (1954) model could occur with eventually increasing wages. However, the experience of many LDCs provides causes for concern on this score.

(9) Agricultural constraints. Bauer and Yamey (1957) and Singer (1958) argued that a balanced expansion of manufacturing sectors would soon run against the problem of insufficient food supplies, which would sooner or later stunt industrial growth. While Rosenstein-Rodan (1943) may have glossed over agriculture, and Nurkse (1953) may have argued that agricultural expansion was

not essential under conditions of disguised unemployment,³⁴ most balanced growth proponents [Lewis (1955) and even Nurkse (1953)] explicitly required a balance between agriculture and industry unless food could easily be imported.

In sum, the critics argued that due to resource and information constraints balanced growth was impossible to achieve, due to the existence of trade it was unnecessary, and because it lost for the economy the benefits of specialization, economies of scale, and linkage effects, gave insufficient attention to social overheads and agriculture, and created dualism, it was not desirable. There is some amount of truth to each of these criticisms, and reveal the caveats to the approach and the dangers of pushing it too far, but do not destroy the case for balance, at least under the conditions faced by many LDCs.

Given the theoretical open-endedness of the debate, it is not surprising that many participants have looked at the actual experience of economies to attempt to resolve the question of the desirability of balanced growth.

The earliest empirical studies examined historical cases. Hughes (1959), Ohlin (1959), Streeten (1959) and Rostow (1960) reviewed the experiences of developed nations during their industrial revolution and found important examples of imbalances between sectors which through linkage effects resulted in overall growth; the examples fit well Rostow's (1960) idea of the leading sector, so central for his analysis of the 'take off'. Rostow provides many other examples in which the growth of particular sectors was crucial for economies in this stage. These historical studies seem to support the unbalanced growth thesis, and the importance of linkage effects. But they (especially Hughes) also point to the fact that imbalances are successful only when they result in balance ex post. It is not clear, however, that they can resolve the debate on LDCs: the structures of the Western economies prior to industrialization need not be the

same as those of the LDCs, and the international environment faced by the two are also very different. Also, the fact that these economies experienced unbalanced growth (and we have a few often-documented examples) does not show that they could not have grown faster had their growth been more balanced.

A somewhat more formal procedure was used by Chenery and Taylor (1968), who examined the relation between sectoral proportions and per capita income, identified 'normal' patterns of development and found that only one more fast growing country had a pattern of growth outside the normal range. A majority of one, an arbitrarily chosen growth rate to decide on distinguish between fast and slow growers, and the definition of balance involved do not allow us to take this to be telling evidence for unbalanced growth [see also section 1 and Demery and Demery (1973)]. More systematic empirical studies began with Swamy (1967) and continued by Yotopoulos and Lau (1970, 1976), and Demery and Demery (1973). Their procedure was to defined a balanced growth rate of a sector (usually the overall growth rate an economy or the manufacturing sector multiplied by its overall income elasticity), calculated an index of imbalance, and examining the correlation between this index and overall growth rates. Swamy and Demery and Demery found that the evidence showed a positive correlation, therefore supporting unbalanced growth, while Yotopoulos and Lau found a negative one, finding support for balanced growth. The crucial difference between them is that the former took an absolute index of imbalance while the latter divided the imbalance index by the growth rate to obtain a relative index. Shashua and Goldschmidt (1972), and Demery and Demery (1973) have criticized the Yotopoulos-Lau index, arguing that the growth rate in the denominator of the imbalance index biases the correlation toward being negative, while Yotopoulos and Lau (1975), however, have argued against the absolute deviations measure of imbalance in

favour of their relative measure on intuitive and economic grounds, as well as on statistical grounds since there may be a tendency for sectoral growth rates to be more clustered when the average growth rate is low than it is high.

Even if we can choose between these measures - the relative measures seems to have a more convincing case - it does not appear that these cross-country statistics can resolve much. The notion of balance in its various forms is notoriously hard to quantify, so that a precise index may do injustice to some or even all of them.³⁵ More importantly, all that these measures show is some kind of correlation between rates of growth and a measure of imbalance and any result could be made consistent with both balanced and unbalanced growth. A negative correlation may simply show that countries with a more rapid rate of growth do not experience widely divergent rates of sectoral growth, but that this was the outcome of imbalances corrected very quickly and at speeds which vary across industries. On the other hand, a positive correlation may simply reflect the fact that economies which have experienced few difficulties with expanding their exports (because of historically given patterns of specialization and international conditions) have grown faster and been able to do so with divergent sectoral rates of growth (facilitated by their openness to trade), rather than the contribution of linkage effects to growth.

We conclude this section by noting that there is much common ground between its supporters and its unbalanced growth critics, and this is reflected in the later literature on the subject. First, both balanced and unbalanced growth approach neglect resource limitations and are relevant for what Streeten (1963) called "ceilingless" economies, (although since the former usually requires a big push its resource requirements are greater); this separates them both from mainstream approaches, but does not imply that they are incorrect. Second, they both

emphasize the role of complementarities, externalities and linkages, disagreeing only how exactly these are to be harnessed to increase the rate of growth: through judicious unbalanced growth or through judicious balanced expansion. Third, there is no division between them on the question of planning versus markets:³⁶ while both balanced and unbalanced growth could conceivably take place under free market conditions,³⁷ under certain other conditions (Nurkse (1953) emphasized the absence of entrepreneurial spirits) both could require government planning if not government investment [see Bhatt (1965) and Mathur (1966)].³⁸ Finally, Nurkse (1959b) narrowed the distinction between the two by distinguishing between balanced growth as an outcome and as an objective: even unbalanced expansion as a method must have balanced expansion - which removed shortages and surpluses and made output rise according to demand - as an outcome [see Streeten (1959) and Bhatt (1965) for example].

In sum, the main argument for a deliberate balanced expansion (and this does not imply that all sectors have to be expanded!) is that shortages and surpluses may create chaos in the economy and that piecemeal advances may lose sight of important externalities, although this is not necessarily the case. The main argument against it is that the resources needed for this expansion may be too great at one point in time; thus some form of imbalance may be necessary. However, these imbalances have to be judiciously created in limited ways where appropriate responses may be expected to remove these disequilibria. The extent and nature of required balance or imbalance in a specific context will have to depend on a variety of issues, including the possibilities and conditions of international trade, the extent of economies of scale, the availability of resources and abilities in the economy, and the responsiveness of different

segments of the economy to shortages and surpluses. There is no blanket case either for balanced or unbalanced growth.

4. Agriculture-Industry Interaction

The balanced expansion of agriculture and manufacturing industry (henceforth industry for brevity) has long been seen as crucial for economic growth, especially in LDCs which have large agricultural sectors. Agricultural stagnation, by limiting food and intermediate good supplies, markets, sources of savings and labour, could constrain industry,³⁹ while industrial stagnation by limiting supplies of capital and intermediate goods and markets could restrict agricultural development. While substitutes through foreign trade may be available, difficulties of export expansion and consequent foreign exchange shortages may not allow such routes to be taken.

Consequently, there has been much discussion of the relationship between agriculture and industry in actual development experience. The role of agriculture in primitive accumulation involving the enclosure movement and the provision of labour to industry, and as a generator of industrial demand in England's industrial revolution, has received much attention.⁴⁰ The question of the possibility of primitive socialist accumulation - involving the squeezing of the agricultural sector by turning the terms of trade against it and later by collectivization of agriculture - to finance industrialization was of paramount importance in the Soviet industrialization debate.⁴¹ The contribution of agriculture to Japanese growth, and the constraint that the sector has created - both from the supply side (adverse terms of trade effects due to production bottlenecks) and demand constraints (problem of markets) - on Indian industrialization has also been emphasized.⁴²

Theoretical attention given to agriculture-industry interaction in economics is not new, attention being given to it in Quesnay's (1757) tables, Smith's (1776) discussion of home markets for the industrial sector, and Ricardo's (1817) analysis of the falling rate of profit due to increases in rents and eventual stationary state;⁴³ the importance given to the issue during the Soviet debate, especially in the work of Preobrazhensky (1965), has already been noted. However, the modern theory of agriculture-industry interaction is usually taken to date back to Lewis (1954, 1958), and given the importance of this work, we will commence with it and survey the rest of the literature in terms of its defects and attempts to rectify them (even if this was not always the actual motivation of the contributions).⁴⁴

Lewis actually distinguished between a modern capitalist sector which used reproducible capital and used hired labour to produce for a profit, and a backward peasant sector which did not use capital and which used family labour to produce for subsistence, instead of making the agriculture-industry distinction, which has been emphasized in the subsequent literature.⁴⁵ He characterized the backward sector as having zero marginal product of labour or disguised unemployment, so that the modern sector had an unlimited supply of labour in the sense that the supply curve of labour to it was horizontal at a wage determined by the average product in the subsistence sector, allowing for a differential to induce migration. In the modern sector, for a given stock of capital (and technology), the level of employment was determined by the intersection of this supply curve and its marginal product for labour curve (under assumptions of profit maximization). The modern sector surplus over wages went to capitalists who were assumed to save and invest their entire profits. This determined the change in the stock of capital over time, pushing outwards the marginal product

of labour curve. Growth occurred with a constant real wage as long as average earnings in the backward sector did not increase and the terms of trade between the two sectors did not change (if they produced different products).

This rapid expansion would not occur unchecked, however. When disguised unemployment disappeared in the backward sector and average earning there increased, labour had to be paid a higher wage, so that the supply curve of labour for the advanced sector would become upward-rising. Furthermore, when labour had a positive marginal product in the backward sector, the total output of that sector fell as labour moved to the advanced sector. At this stage Lewis identified the backward sector with peasant agriculture and the modern with capitalist industry, and argued that when agricultural output fell, the terms of trade would move against industry, putting further upward pressures on the industrial wage. Profits in the industrial sector, consequently, would be squeezed, and growth would slow down.

The model explains several important stylized facts that were mentioned in section 2, such as the increase in the savings rate of the economy, and the inverse-U shaped relation between inequality and per capita income, and the shift of labour from the agricultural to the industrial sector (if this sectoral distinction is considered). Although not intended to be a model of agriculture-industry interaction, it also formalized some aspects of it, that is the role of agriculture in supply labour and food to the industrial sector. As long as these went well, growth through capital accumulation in the modern sector was rapid; but eventually, agriculture constrained industry both by limiting labour supplies and through constraints in food production. Lewis discussed technological change and other mechanisms which could overcome these obstacles, but did not incorporate them formally into his model.

Formal presentations of Lewis's work, making the analysis more precise but losing in institutional richness, started with Ranis and Fei (1961) and Fei and Ranis (1964). They gave greater attention to the agricultural sector than did Lewis introducing the unrealistically energetic landlords which would appropriate the agricultural surplus after peasants left for the industrial sector and make it available for sale in that sector - for which they have been criticized by Dixit (1973), analyzed in detail the different 'turning points' in the economy which made the supply curve of labour turn upwards, and incorporated the effects of technological change and population growth into the analysis. Although not formally outlining the process of capital accumulation in the agricultural sector, they trace a pattern of 'balanced' growth through technological change and capital accumulation in both sectors (pushing outward both supply and demand curves for labour in the industrial sector) which would sustain investment incentives in both sectors by leaving unchanged the intersectoral terms of trade and by ensuring that the agricultural sector would supply enough labour to satisfy the expansion of the industrial sector at a constant wage. The Lewis-Ranis-Fei model has been formalized more rigorously by Fei and Ranis (1966), Jorgenson (1967), and by Dixit (1973), who provides the clearest discussion of its properties. Niho (1976) clarifies the role of the price elasticity of demand in the model, but discusses only a short-run version of the model with given stocks of capital in each sector.

The Lewis model - and its formalization - has been subject to an enormous amount of criticism, not the least of which is that it does not explain why so many surplus-labour economies fail to industrialize. We review the main criticisms of the approach and discuss contributions remedying the defects.⁴⁶

1. Internal logic of the model. Guha (1969), Wellisz (1969) and others have argued that given Lewis's assumptions even in the initial stages of industrial growth the industrial product wage would increase, so that the growth process would be aborted: the reduction in the agricultural labour force which at constant output (with zero marginal product of labour) would push up the average product,⁴⁷ and the industrial wage gap would result in higher demand for food, raising the relative price of the agricultural good. Lewis (1972) has responded that the assumptions of zero marginal product, surplus labour in some sense, and that the average product in the backward sector determines the advanced sector wage, are not required for his results: the central assumption is a constant advanced sector wage in terms of its own product. This could be supported, for instance, by assuming an endogenously variable wedge between agricultural income and the industrial wage which holds the latter constant.⁴⁸ However, this type of defense detracts from the logical neatness of Lewis's (1954) motivation for the fixed real wage assumption. An alternative way to overcome the inconsistencies is to assume, as Fei and Ranis did, that landlords in agriculture mop up the agricultural surplus, and that there is no wage gap; these assumptions, especially the first, seriously limit the applicability of Lewis's model, since they apply at best to those areas in which tenancy is dominant with peasant incomes reduced to subsistence. Moreover, subsistence, once again, cannot be determined objectively as earnings in some other sector, which was what Lewis had purported to have shown. Thus the Lewis growth process seems to be doomed from the start due to rising wages except under restrictive assumptions. But, as Guha (1969) suggested, growth could occur if technological change occurred.

2. Neglect of dynamic rationality of capitalists. Enke (1962) and Basu (1984) have criticized Lewis's assumption that all, or at least a fixed share, of

profits is saved and invested. Basu argues that while Lewis makes capitalists optimize profits statically, he does not allow them to optimizing dynamically in making their saving and investment decision. It is possible that if capitalists were aware that their investment decisions imply pushing down their rate of profit, as dynamic optimizers they may choose to save less and consume more, so that the growth rate would be reduced even with a fixed real wage.

3. Neglect of dualism within dualism. Although the agriculture-industry dualism was not assumed by Lewis who preferred to think of the backward-advanced dualism, the subsequent literature has stressed that the fundamental dualism in LDCs is between backward agriculture and advanced industry. Bharadwaj (1979), discussing the relevance of the model for the Indian economy, points out that the agricultural sector may have a peasant sector and a capitalist sector; the characterization of agriculture as a peasant one certainly conceals the great diversity within LDC agriculture, featuring a variety of arrangements, including sharecropping and other forms of tenancy.⁴⁹ The industrial sector may have an advanced and an unorganized sector, with an oligopolistic advanced sector and a competitive unorganized sector. LDCs also contain a service sector which, as Dixit (1973) notes, has been ignored in this model.

Clearly, not all criticisms of this types can be taken care of in a manageable model relevant for one economy. However, their essential point is that dualisms can exist within dualism, and models which disaggregate the major sectors can usefully be constructed. Models disaggregating the industrial sector into organized and unorganized subsectors have already been noted (Fields (1975), Mazumdar (1976)). Dutt (1984b) extends the Taylor (1982, 1983) model to allow for two agricultural sectors, a capitalist one and a peasant-subsistence one, with both groups renting land from landlords. The wages of peasants who farm

their rented land and work on capitalist farms is fixed at subsistence due to the existence of surplus labour and rent is equal to the surplus product of peasants; capitalists pay the same rent and the surplus over the wage and rent is their profit. In this model an expansion of investment spending expands industrial output and employment, the demand for the agricultural good and the relative price of food, but since this may depress the agricultural rate of profit, may in the longer run - not formally analyzed in the paper - slow down the rate of agricultural growth. Rao (1987b) also considers a static two-sector model where the agricultural sector is part peasant and part capitalist with agricultural land exogenously distributed between the two modes, the wage in the capitalist agricultural and industrial sectors equal to the average product in the peasant sector; perfect competition prevails everywhere. The analysis shows that a completely peasant agriculture implies a higher industrial wage than a completely capitalist agriculture (because in that case the wage would be given by the marginal, rather than the average product). For a dual agriculture, moreover, an expansion in land (which may be interpreted as land-capital) may reduce agricultural profits and industrial profits by raising the average product in the peasant mode, even if this expansion is balanced in the sense of expanding industrial capital to keep unchanged the intersectoral terms of trade; capitalist may thus be unfavourably inclined towards agricultural development.

4. Exogenously given dualism. The model can be criticized for taking dualism for granted. As Arrighi (1970) points out, it does not examine the origins of dualism: it ignores the fact that the structural excess supply of labour in the backward sector was not an "original" or "natural" state, but the outcome of deliberate actions by colonial governments to provide a source of cheap labour. Kanbur and McIntosh (1988) point out that it does not examine whether dualism is

self-perpetuating, or whether dualism will eventually disappear. Clearly, one model cannot answer all the questions, and it is not clear that ignoring these issues creates problems for the model in analyzing the dual economy phase. Nevertheless, the examination of institutional changes is important.

Attempts to explore the institutional bases of the low, fixed, wages in the industrial sector, assumed in some of the dual economy models, have been made. Perrings (1986, 1987) has examined how governments can manipulate agricultural output and input prices through taxes and subsidies to reduce average agricultural income, which is the opportunity cost of industrial labour. Thus, the poverty of the agricultural sector is not an original state, as it may appear from the presentation of Lewis-type models, but an outcome of government policy with a systematic bias against agriculture.⁵⁰ The terms of trade can also be manipulated against agriculture to keep down the industrial product wage by perpetuating peasant production in agriculture which, since it does not have to pay a capitalist wage and a capitalist profit, will sell at a lower relative price than would capitalist agriculture; these issues have been analyzed by Caballero (1984) using the concepts of unequal pricing and unequal exchange, and run contrary to Rao's (1987b) analysis discussed above. Regarding the future of dualism, Lewis (1954) himself had a few things to say, and more can be found in the study of the dynamics of institutional change in agriculture [see Dutt (1984b), for example].

The criticisms which have been most productive of positive contribution, however, are the following.

5. Absence of surplus labour and the development of neo-classical models.

Neoclassically oriented economists have argued that the marginal product of labour is not zero, and that disguised unemployment and surplus labour does not

exist in LDC agriculture; this implies that that the wage in the industrial sector is market-determined rather than fixed. These criticisms have been associated with the poor-but-efficient view of traditional agriculture associated with Schultz (1964) and others. Debates regarding these issues are not very relevant to the validity of Lewis's model, however. Lewis (1972) admitted that he should not have mentioned zero marginal product at all, but just assumed a horizontal supply curve of labour to industry; we have seen earlier that these two go along rather uneasily with each other. However, if labour is scarce, then the fixed real wage assumption is difficult to accept, and one would then have to modify Lewis to allow for the neoclassical determination of the real wage.

This is exactly how Jorgenson (1961, 1967) modified the model. He considered a model in which agriculture produced with given land and labour and industry produced with accumable capital with Cobb-Douglas production functions; exogenously given rates of technological change were assumed for both sectors. The rate of growth of population became constant (after a phase in which it increased with per capita income); Jorgenson showed that if this rate was low compared to the rate of technological change in agriculture, taking the strength of diminishing returns in agriculture into consideration, the demand for food (which in per capita terms was assumed to have zero income elasticity beyond a point) would grow at a rate which would make it possible for labour to be released for employment in the manufacturing sector. In that sector capitalists hired labour to produce in order to maximize profits; wages are a constant ratio of the (variable) average product in agriculture, and all profits were saved and invested. Jorgenson computed the asymptotic rates of growth of the variables of the model. If technological change in agriculture was not rapid enough relative to population growth, the manufacturing sector would not emerge, the agricultural

sector could never produce a surplus and release labour for industry, and the purely agricultural economy would settle at a low equilibrium trap.

Jorgenson (1967) compared a formalization of the Lewis-Ranis-Pei model, which he called the classical model to his, neoclassical model, and argued in Jorgenson (1966) that the latter was more consistent with empirical evidence. However, Marglin (1966) and Dixit (1970) have argued correctly that this does not show the superiority of the neoclassical version, since Jorgenson was comparing specific versions of the two models, and was comparing the asymptotic results of his models with the surplus-labour phase of the classical model (which eventually became neoclassical). Dixit (1970) examined the properties of the Jorgenson model in finite time and showed that the differences between the time paths of some key variables in the two models turn out to be negligible.²¹ However, this does not imply that there are no differences between the two models: they emphasize two different constraints on the growth of the dual economy, the neoclassical model the problem of labour supply from agriculture, and the classical model the scarcity of industrial capital.

Jorgenson's model made many strong assumptions, and several subsequent contributions have generalized his results; not all find his results to be robust. Zarembka (1970) relaxed the assumptions of zero income and price elasticities of demand by assuming constant elasticities; the introduction a less than unit income elasticity (consistent with Engel's law) did not change the viability condition for growth in the dual economy but emphasized the marketed surplus problem and reduced the rate of industrial employment (see also Dixit, 1973), while the price elasticity eases the viability condition and also makes it depend on the rate of technological change in manufacturing (see also Niho, 1974). Kanbur and McIntosh (1988) have also shown that allowing general demand

functions for food may allow the model to have a long-run equilibrium in which agriculture and manufacturing coexist, whereas the Jorgenson economy was pushed towards complete specialization. Sato and Niho (1971) also generalized Jorgenson to allow the population growth rate to be an increasing function (with an upper bound) of per capita income and Marino (1975) considered general neoclassical production functions, to demonstrate the robustness of Jorgenson's results. McIntosh (1975) who allowed general utility maximizing behaviour on the part of workers and intersectoral differences in fertility rates to show the possibilities of non-uniqueness of the balanced growth path and cycles around it. Finally, several contributions, including Kelley, Williamson and Cheetham (1972) (who introduced a variety of other modifications and simulated the rather complicated model), Niho (1974) and Amano (1980) have allowed for capital accumulation in both sectors: Niho (1974) showed that the viability condition depended on the rate of technical change in industry even with allowing for the price elasticity of demand, and Amano (1980) has shown with general production and utility functions that even if a Jorgenson-type viability condition is fulfilled, the economy may stagnate at a low income level because of the absence of a balanced growth path, and if the income and price elasticities of demand for food are large, the economy may experience lasting fluctuation in income and labour allocation.

6. Neglect of demand and the development of demand constrained models. By assuming all saving was automatically invested, Lewis was assuming away the problem of effective demand for the industrial good. As noted by Johnston and Mellor (1961), this meant that the agricultural sector did not support industry by providing a market for its product, since the industrial sector had no market problem.

To introduce the market problem into the model and allow agriculture to play a role which has received much importance in the informal literature, industrial firms can be assumed to have an independent investment function. A variety of models have been produced which do just that along Keynes-Kalecki lines.

The earliest models were short run and Keynesian in nature, exploring macroeconomic adjustment with given stocks of capital in each sector. Lysy (1980) examines a one sector model to show that an additional output from an exogenous increase in the stock of capital (due to investment) would not automatically find markets as in Lewis's model; the price would fall, and raising demand somewhat, but not to the isoquant implied by a fixed wage-rental ratio as in Lewis;⁵² capital would be substituted for labour, thereby explaining resulting in the low growth of employment even with unlimited supplies of labour. While Lysy's model has only one sector, Bell (1979) examines several different short-run Keynesian models of a dual economy with exogenously given real investment, and compares them to a Lewis model with a fixed wage, a neoclassical model with supply-demand determined wage, where both models have investment endogenously determined by the level of saving. The analysis shows how different 'closing rules' can be employed to produce different models from a general framework with very different properties. Rakshit (1982) also introduces effective demand problems into his short-run two-sector dual economy model by assuming a Keynesian investment demand functions to show that demand constrained equilibria occur at low levels of investment demand while supply constrained ones occur when investment demand is high.

Other models have a stronger Kaleckian flavour,⁵³ and distinguish between a fix-price manufacturing sector in which the price is determined as a markup over prime (labour) costs and output is demand determined in the presence of excess

capacity, and a flexprice agricultural sector with output given in the short run, and the price varying to clear the market. Taylor (1982, 1983) provides a detailed analysis of the model, which in true Kaleckian tradition, distinguishes between the spending patterns of different classes, assumes fixed coefficients of production, and takes as given investment levels for each sector in the short run. A simple variant of the linear expenditure system is assumed to provide Engel effects. The level of investment in each sector (the industrial sector uses capital and the agricultural sector uses land-capital) is given in the short run.

In the short run, for given capital stocks and the money wage, the industrial output and agricultural price vary to clear the goods markets. A diagrammatic treatment is available in Chichilnisky and Taylor (1980) and Taylor (1982, 1983) provides the algebraic details. The comparative statics exercises show, among other things, that an increase in investment pushes up the agricultural terms of trade by increasing the demand for food, and that an increase in food production reduces the price of food, and by increasing its demand, increases the production of the industrial good. Excessive investment demand may take the industrial sector to full capacity, so that quantity adjustment is no longer possible, and the markup must become endogenous.⁵⁴ In the medium run the money wage in the model can be made to respond to a difference between the actual and desired real wage. As shown in Cardoso (1981), this can result in an inflationary spiral with increasing food prices, money wages and industrial prices.

In the long run, stocks of capital in the two sectors changes due to investment, possibly taking into account these inflation stories as well. Several possibilities are opened up, depending on how investment behaviour in the two sectors are modelled. Taylor (1982, 1983) examines a case in which the rate

of accumulation in the agricultural sector is constant, depending, perhaps on institutional constraints in the sector, and that in the industrial sector depends on rate of profit differentials. Taylor (1982) also considers another possibility, in which the accumulation rate depends on the rate of profit in each sector in a standard neo-Keynesian way, with identical investment functions for the two sectors. It is shown that for both cases, the economy converges, in the long run, to a balanced growth path. In the former case, the rate of growth of the economy is constrained by the exogenously fixed rate of accumulation in the agricultural sector, while in the latter, it is constrained by 'animal spirits' in the two sectors, represented by the parameters of the investment functions. Rao (1987a) considers yet another possibility by interpreting agricultural capital at least partially as infrastructure (which is produced in the industrial sector) and assuming that investment in this is financed by government revenue from indirect taxation at a fixed rate on the industrial good. The implication is that an increase in the government saving rate - channelling more government revenues to investment in agricultural infrastructure - increases agricultural production, reduces its relative price, increases real incomes of workers, raises industrial demand and the growth rate. The market constraint on industrial sector growth due to a slow growth of the agricultural sector becomes obvious in this model. Finally, Rattso (1986) works with an independent investment function for the agricultural sector making agricultural accumulation depend on the terms of trade, and there is a given level of investment demand in the industrial sector.

7. Neglect of the migration process and the development of migration models.

The Lewis model assumes that exactly that amount of migration will occur from the backward to the advanced as required by the expansion of the latter, so that

there will be no open unemployment there; this was contrary to the experience of LDCs. The model therefore did not pay sufficient attention to the migration process. Although the Lewis model itself can be faulted on this ground since he did not assume that his two sectors were regionally separated, since a whole body of literature has in fact identified the two sectors as the agricultural (rural) and industrial (urban) sectors, these models cannot be absolved of this charge.

Several modifications of the Lewis model have been proposed to take care of this problem. The seminal contributions were those of Todaro (1969) and Harris and Todaro (1970), which assumed the flow of migration from rural to urban areas depended on expected wage differentials. Since open unemployment existed in the urban areas (but not in the rural areas) the expected wage was obtained by weighting the wage by the 'probability' of finding a job there. Todaro (1969, 1976) made the 'probability' of finding a job equal to the flow of new jobs divided by the stock of unemployed (a mistake was corrected by Zarembka (1970)) and assumed a given rate of growth of urban employment and a given relative wage differential between the two sectors, while Harris and Todaro (1970) assumed a given wage for the urban sector and made the probability of finding a job in the urban sector equal to the total number of jobs there divided by the total urban population (employed and unemployed). An important implication of these models is that an expansion in the urban sector which increases the labour demand there may not reduce unemployment there: by increasing the probability of finding a job there it may result in a massive migration which may actually increase the rate of unemployment there. The alleviation of this problem requires the expansion of the rural sector: an increase in the earnings in the rural sector caused by this will reduce the wage differential and reduce the unemployment in urban areas. This insight provides us with an additional reason for balanced growth: for

reducing the problem of urban unemployment while expanding that sector, one may probably have to expand the agricultural sector as well.

These papers have spawned a voluminous literature. Bhagwati and Srinivasan (1974) and Corden and Findlay (1975) provided neat expositions of the model, incorporating it into the trade-theoretic literature; they also examined different types of policy interventions in reducing unemployment and raising social welfare.²² Subsequently, extensions of the model occurred in several directions. The Harris-Todaro assumption of a fixed urban wage was replaced by alternative theories of endogenously determined wage differentials: Stiglitz (1974) and Amano (1983) in terms of the importance of labour turnover costs, Stiglitz (1976, 1982) in terms of efficiency wages, Calvo (1978) in terms of trade union behaviour and Calvo and Wellisz (1978) in terms of costly supervision; Khan (1980) provides a synthesis of these alternative theories. Amano's results show that the equilibrating force of the Harris-Todaro migration mechanism may not always work. The Harris-Todaro labour market distortion explanation of unemployment was replaced by Gersovitz (1974) and Haessel (1978) by a Keynesian assumption of given investment demand. Further work went into the migration function: Blomqvist (1978) compared the Todaro and Harris-Todaro formulations and synthesized them, Arellano (1981) shows how different specifications of the migration function lead to different implications of urban job-creation for unemployment, variable hours of work and leisure considerations affecting migration are introduced by Bhatia (1979), and unorganized urban sectors are introduced by Fields (1975) and Mazumdar (1976). Mobile capital has been introduced in an open economy setting by Corden and Findlay (1975) and Khan (1980, 1986), and the implications of this for stability have been explored by Neary (1981, 1988) and Funatsu (1988). The dynamic implications of migration

have been examined by Robertson and Wellisz (1977), Jha and Lachler (1981), Das (1982), Bartlett (1983) and Gupta (1986) by introducing capital accumulation.^{5*} Bartlett (1983) has argued that the Harris-Todaro formulation is inconsistent with the dynamic features of the two-sector growth models, and instead uses the Todaro formulation. He shows, both for a classical economy with a fixed agricultural wage and a neoclassical one with a variable one, that an equilibrium for the labour allocation ratio exists, but that it is a saddlepoint so that the migration equilibrium is unstable. Kanbur and McIntosh (1988) show that this result does not depend on Bartlett's use of the Todaro migration function, but in making migration take place at a speed commensurate at the rate of increase of capital stock in the economy. This result underscores the importance of assumptions about speeds of adjustment of different variables for the dynamic behaviour of macroeconomic models in general.

The choice-theoretic approach to migration based on the work of Harris and Todaro has been criticized by Godfrey (1979), who argues that it is preferable to examine migration in terms of structural shifts in the distribution of assets between different classes within rural areas. This raises the possibility of treating different groups differently, as argued by Lipton (1980), thus departing from the approach of considering only the representative migrant. While this approach seems promising, the feasibility of these approaches in macro-models of agriculture-industry balance has not yet been demonstrated.

Having discussed the Lewis model, its criticisms, and the subsequent contributions, we make the general remark that we do not have just one type of agriculture-industry model, but actually a variety of them, which make different assumptions about the nature of the two sectors. In the language introduced in section 2 we can think of a general framework for the examination of agriculture-

industry interaction, and think of the different models described so far as providing alternative closures of it. The greatest variety of alternatives is found for the industrial sector: the Lewis model can be thought of as a neo-Marxian closure with a fixed real wage, the Jorgenson one obviously a neoclassical one with full employment growth, and the demand constrained ones using neo-Keynesian and Kalecki-Steindl ones. The agricultural sector is also different in different models: neoclassical in Jorgenson, but neo-Keynesian in some of the demand constrained models. The models discussed so far, however, do not exhaust the list of possible closures.

One set of these revolve around the work of Kaldor (1976, 1979), which has been formalized by Vines (1984), Targetti (1985) and Thirlwall (1986).⁵⁷ The agricultural sector is assumed to save a fraction of its income and invest it within the sector; since the industrial good is the investment good this implies a negative relation between the rate of capital accumulation in agriculture and the relative price of the industrial good. The real wage in the industrial sector is fixed in terms of the agricultural goods - shades of Lewis - and full capacity profits are saved and invested here as well. The neo-Marxian closure is very similar to Lewis's, although there are some differences in assumptions. Rattso (1986) also considers an identical closure - although it is inappropriately called a neoclassical one - but allows investment in the two sectors to differ from internal savings by making industrial investment depend on the terms of trade (with agricultural investment being residually determined). Rattso (1986) also considers a closure with investment in each sector being determined by independent investment functions, with the saving rate out of profit income (affected by government tax policy, perhaps) being allowed to vary, following Johansen (1960a). Finally, a different closure has been suggested by

Sarkar (1988) which considers a stationary state at which agricultural output is fixed and industrial production is constrained by the supply of a wage fund (which is a positive function of the rate of profit in industry; the wage is indexed to the food and industrial wage goods prices. The model implies that an increase in agricultural output reduces food prices and raises the profit rate so that by raising the wage fund it increases employment and output in the industrial sector so that agriculture constraints industrial output and employment from the supply side.

The models derived from these alternative closing rules tell different stories regarding the interaction between the two sectors and reveal different ways in which they may constrain and help each other. Consequently, the policy implications of one model do not necessarily carry over to the others: for example, government spending on industrial goods in the demand constrained model increases industrial growth, at least in the short run, but in supply constrained models they may reduce industrial employment. It is therefore important not to slavishly adhere to one model but examine the structure of an economy carefully and use one's best judgement to decide on which particular closure to apply.

In the remainder of this section we comment briefly on four uses and extensions of the models of this section, involving policy issues with special attention to the terms of trade, technological change, food stockholding, and North-South models.

Regarding policy issues, all the models discussed here have implications that can be examined by introducing policy parameters into the models and examining their implications for the economy; some of these implications have already been commented upon. More formally, dynamic optimization approaches have been used to derive shadow prices and optimal policy rules (regarding choice of technique and

allocation of investment, for example). The properties of the Lewis model have been examined in a steady state framework by Hornby (1968), while Dixit (1968), Stern (1971) and Marglin (1976) consider the maximization of the present discounted value of per capita consumption. Dixit (1969) focusses on the marketed surplus problem to examine the problem of minimizing the amount of time required to attain a specified level of capital stock in manufacturing by manipulating the price of food received by farmers and paid by workers and the allocation of investment between the industrial and agricultural sectors. Although the objective is to reach a target capital stock in industry, the solution involves a great deal of investment in agriculture to solve the marketed surplus problem; this reflects the dangers of excess preoccupation with the industrial sector and neglect of the agricultural sector.

One of the key policy issues in actual debates surrounding agriculture-industry interaction concerns the terms of trade between agriculture and industry. While the models discussed so far mostly determine this relative price, it is possible to modify them to have them as exogenous parameters, or at least affect them using other policy parameters. Opinions have been divided on which way the terms of trade should be pushed if policy makers have the means for pushing them. Lipton (1977) and others have argued that urban bias in policy making has pushed the terms of trade against agriculture, resulting problems for agricultural and therefore industrial growth; this school recommends making it more favourable to agriculture. Preobrazhensky (1965), on the other hand, supported industrialization by squeezing agriculture with the terms of trade, not heeding Bukharin's (1971) warnings about its effects on agriculture. These issues have been addressed using different agriculture-industry models.

Gibson and McLeod (1982) have utilized a Sraffian model using intermediate goods - thereby departing from the other models of this section - to examine the impact of changes in the terms of trade on agricultural growth. Taking the terms of trade to be exogenously determined and a given money wage (they have to forsake the assumption of a given rate of profit between the two sectors since the terms of trade is being manipulated), they show that if intensive rent exists (due to the scarcity of a single quality of land), moving the terms of trade in favour of agriculture may reduce the rate of profit in agriculture, and therefore slow down the rate of investment and innovation in the agricultural sector. Contributions by Andrews (1985a, 1985b) and Gibson and McLeod (1985) have shown that the conditions under which this type of response can occur depends on whether a fixed money wage or a fixed real wage are assumed, and the conditions could involve both the level of the rate of profit and the nature of techniques used in agriculture.

The effect on growth in the industrial sector has been examined by Sah and Stiglitz (1984, 1987) using a static neoclassical model with full employment. They show that if the response of marketed surplus to the terms of trade is positive, the terms of trade can be turned against agriculture to increase the level of investible resources in an economy in which peasants can choose their hours of work, consumption and production, but industrial workers have fixed hours of work, and the government can change the industrial wage.⁵⁰ They thus vindicate Preobrazhensky, but in opposition to him show that this is possible only by squeezing industrial workers. A surprising feature of the model is that a higher terms of trade effect on investment effect requires a higher, rather than a lower terms of trade elasticity of the marketed surplus, exactly the opposite of what is usually required. Blomqvist (1986) and Carter (1986) show

that Sah and Stiglitz obtain this result using peculiar assumptions. Blomqvist demonstrates, using a tax wedge to sever the price of food paid to peasants and paid by workers, that a smaller price elasticity of marketed surplus raises the rate of investment more when the terms of trade is turned against agriculture, and that it is possible to do this without hurting industrial workers.

Sah and Stiglitz (1984) also consider the problem of the optimal terms of trade and optimal tax rates, using a Bergsonian social welfare function and a given social value of marginal investment. What contributions such as these abstract from are the political economy issues which affect the terms of trade, as have been stressed by Lipton (1977) who believes in the presence of urban bias, and the more radical analysis of Mitra (1977) who points to the power of rural interests in pushing the terms of trade against industry. Thus, the terms of trade emerge as an exogenous variable in an economic model, but rather than being a choice variable, it is determined by a wider political economy model.

Regarding technological change, we have already examined its importance for the Lewis and Jorgenson models.²⁹ Aside from study of the growth effects of technological change in general, several additional wrinkles have been introduced. Houthakker (1976) has used a neoclassical model to explain the sectoral inequality of per capita incomes in terms of differential rates of technological change (and differential income elasticities of demand). Lele and Mellor (1981) have examined the implications of different biases in technological change in agriculture in terms of the Lewis model: if such change increases labour's share in agriculture, higher worker consumptions may lead to a decline in the marketed surplus of foodgrains, raise the (with labour having a positive income elasticity of demand for food while for landlords this elasticity is zero) which will increase the real wage in the industrial sector, reducing employment

there; labour saving technological change, however, will have more favourable effects. This result may not hold in a demand constrained model, however. Regarding the nature of industrial technological change Fei and Ranis (1964) had already pointed out the difficulties associated with labour saving technological change: the marginal product curve in Lewis's advanced sector may not move out in a way to increase employment.

Regarding the holding of foodstocks, the models so far have abstracted from this issue which has received a great deal of attention in the popular literature on agriculture-industry interaction. However, Rakshit (1982) and Dutt (1986b) demonstrate in different ways that this important issue can be incorporated into the agriculture-industry models. Dutt (1986b) introduces a stock equilibrium concept for the agricultural market, replacing the flow concept used by the models of this section, into a Taylor (1982, 1983) type model, and shows the stock equilibrium concept makes a difference for macroeconomic adjustment and how increased food speculation can lower the growth rate of the economy in the short run. The long-run consequences of this behaviour await exploration.

Finally, the models of this section have been applied to examine the interaction of the North and South in international trade. The models applied to this problem are very similar to the models considered in this section, although due to the fact that labour is not as mobile internationally as it is intersectorally (the models usually abstract from labour mobility), a variety of closures not possible here can be applied to the North-South issue. Further, the basic North-South models also abstracted from the mobility of capital, which require the imposition of balanced trade as well. The basic models were developed by Findlay (1980) who considered a neoclassical North growing with full employment and a neo-Marxian South growing with a fixed real wage, by Taylor

(1981) who had a Kalecki-Steindl North and a neo-Marxian South and by Vines (1984) who assumed both regions to be neo-Marxian. Dutt (1987b) has compared the different models in terms of a general framework, and surveyed the rapidly growing literature on North-South trade. A problem with many of the models developed in this literature is that they are, by assuming complete specialization in international trade, too much like the models of this section.

5. Balance between consumption and investment good sectors

Another sectoral distinction that has attracted much attention is that between two types of manufactured goods - consumption and investment (or capital) goods. The basic issue is that an economy which is trying to raise its rate of growth by increasing its saving rate must not only save more, but also physically have the investment goods to expanding its capital stock - a one-sector framework assumes away this problem by allowing the same good to be consumed and invested.

The problem arose during the Soviet industrialization debate of the 1920s, and a two sector model was developed by Feldman to address the issue; it was later popularized by Domar (1957). This approach was used in the Soviet Union to devote a large share of its investible resources to produce investment goods, choosing a higher rate of growth over a high rate of current consumption. The same problem arose with the initiation of planned development in LDCs such as India, where there was a preoccupation with capital shortage in the early 1950s. A model, similar to Feldman's was developed by Mahalanobis (1953), and made the basis for the early Indian Five Year Plans.⁶⁰

A simple version of the Feldman-Mahalanobis-Domar (FMD) considers a closed economy with two sectors producing consumption and investment goods (denoted by subscripts C and I) with two homogeneous factors of production, capital and

labour, using fixed-coefficients technology. Labour is abundant, and capital, once installed, is non-shiftable and (only for simplicity) non-depreciating. The planners can maintain full capacity in both sectors and choose the allocation of investment. Denoting stocks of capital by K_i and capital-output ratios by b_i , the change in the stocks of capital in the two sectors is given by $dK_i/dt = \theta K_i/b_i$ and $dK_c/dt = (1-\theta)K_i/b_i$ where θ is the investment allocation parameter; the sectoral rates of growth of capital stock can then $g^i = \theta/b_i$ and $g^c = (1-\theta)(K_i/K_c)/b_i$. Starting with any historically given K_i/K_c , for a given θ , the economy will converge to a steady growth path with $K_i/K_c = \theta/(1-\theta)$. The main implication of this model follows: an increase in the share of investment allocated to the investment goods sector increases g^i and reduces g^c for the given K_i/K_c (these can be interpreted as short run effects), but in long-run equilibrium (with steady growth), both sectors grow at a higher rate, and the K_i/K_c increases. Thus a higher rate of growth in the future requires a sacrifice in terms of lower current rate of increase in consumption good output.

This model has been extended to deal with an optimal planning exercise: what values of θ should be chosen so as to maximize the present discounted value of consumption? Using a constant-elasticity utility function and a given social rate of time discount, Bose (1968) showed that in the infinite horizon case the economy should eventually aim for a K_i/K_c which depended on b_i , the rate of time discount and the elasticity of the marginal utility schedule, and should try to attain that as soon as possible, either by setting θ equal to 0 or 1. This type of extreme behaviour by planners, however, seems to be unlikely, since there are probably many constraints - not least political ones - which need to be incorporated into the exercise.²¹ What can be done with the model is either to introduce additional constraints into the optimization exercise, or to use it to

find the implications of different allocation ratios, and to see what kinds of mechanisms can be instituted to bring about that pattern of investment allocation in an economy. In an economy in which the allocation of investment is decided and implemented by the state planners, the allocation may be easily done, but in economies where investment decisions are to a large part the result of private activities, tax-subsidy schemes, or other kinds of measures can be used.

The FMD model has been subjected to a fair amount of criticism, some of it related to its actual application.

(1) There are difficulties in isolating investment and consumption goods: a large part of production in LDCs is for intermediate use and many production sectors produce both investment and consumption goods; it is not obvious into which of the sectors these should be included. These difficulties not only imply that the FMD model may be operationally difficult to use, but it also implies that the model may be theoretically flawed in overemphasizing the non-shiftability of capital between two different sectors.

One way of overcoming these problems is to introduce additional sectors into the model. Raj and Sen (1961) have used a four sector model which, in addition to an investment goods (which produces investment goods only for the consumption goods sector) and a consumption goods sector, has an M-sector producing 'basic' investment goods for the I sector, and an R-sector producing intermediate goods used by all sectors. They have used this model, which is in other respects like the FMD one, to analyze growth paths under the assumption of a constant consumption-income ratio. Cooper (1983) has provided a formalization of the model and examined its growth paths under the assumption that the allocation of investment to the M-sector (the analogue of θ in the FMD model) is given. The implications of an increase in this allocation have effects on current and future

consumption very similar to those in the FMD model. Optimality exercises in models of this type, which add a raw material producing sector to the FMD model are available in Weitzman (1971).

(2) It has been argued that LDCs do not need to allocate investment to the investment goods sector if they want to grow faster, since they can import the investment goods that they need. Even if the closed economy assumption was valid for the Soviet economy when it faced a hostile West, it is often argued that LDCs today usually are not forced into autarky. Thus it has been claimed that if LDCs have comparative advantage in the production of consumption goods, they should specialize in them and import investment goods rather than producing them inefficiently, and import substituting industrialization has been criticized along these lines.

However, if LDCs face foreign exchange constraints because their export growth is limited, they may not be able to import an adequate amount of investment goods. Harris (1972) has examined this question using an FMD model for an open economy with three sectors: a consumption good sector producing a good consumed at home, an investment good sector, and export good sector. Exports are exchanged for investment goods at fixed terms of trade under conditions of balanced trade. Harris's analysis of the growth patterns resulting from a given allocation of domestic investment goods between the consumption and investment sectors (capital in the export sector must be imported) and a given allocation of imported investment goods between the three sectors shows that an investment allocation giving priority to the expansion of the domestic investment goods sector still determines the long run rate of growth of the economy provided that the rate of growth of exports falls below a specified upper limit which can be interpreted as the growth rate of domestic investment goods in the absence of

trade; otherwise the growth rate depends on the allocation of imported investment goods to the export sector. If export growth of LDCs is limited by slowly-growing foreign markets, the importance of the FMD result becomes apparent even in an open economy.⁴²

(3) In India it was argued that the over-emphasis on the investment goods sector resulting from the use of this model led to the neglect of the agricultural sector, and that the resultant stagnation of that sector was responsible for the poor performance of the Indian economy.⁴³ Essentially, the argument was that the agriculture-industry distinction may be a more important than the consumption-investment one, or at any rate, the model should have incorporated an agricultural sector as well. This draws attention to the basic point that focussing on one dichotomy distinguishing two sectors makes theoretical sense in isolating one problem for close scrutiny, but for actual economies such simplifications may be dangerous.

Mahalanobis (1955) did produce another model which divided the economy into four sectors - investment goods, factory production of consumption goods, household production of agricultural goods (which included agriculture) and a service sector - thereby incorporating agriculture into the analysis. With given labour-output and output-capital ratios and a given total investment, he considered the allocation of this total to meet required increases in output and employment in the economy. While with this model Mahalanobis was able to justify emphasis on labour-intensive sectors in addition to that on the investment-good sector (based on his two-sector model), Komiya (1959), using a maximizing version of the model found the optimal solution to be different from Mahalanobis's fixed target model. Moreover, this model hardly took into account the complex relations between the agricultural and industrial sectors of the economy.

(4) Finally, the model assumes that the state can generate enough demand to maintain full capacity utilization in the economy. Even in socialist economies the shortage of materials or labour, or absorptive capacity problems may create excess capacity. With excess capacity in the investment goods sector it may not opportune to invest more in that sector. Capitalist economies may also face effective demand problems which result excess capacity.** More generally, the FMD model does not explore what is happening to demand, prices, income distribution, and so on by providing a complete model of the economy. To obtain a better idea of the functioning of the economy one needs to embed the investment allocation problem in different two-sector models of growth and income distribution.

The FMD model applies to an economy in which planners can actually allocate investment between the sectors (and where they can also maintain full capacity utilization); since capitalist economies may not fit these conditions, this model is not generally relevant for them. For them there are other models, however.

Among these, the earliest formal two-sector models emphasizing the consumption-investment distinction were two-sector generalizations of Solow's (1956) one-sector neoclassical model, developed by Uzawa (1961, 1963), Solow (1961) and Drandakis (1963). However, these models are very distant cousins of the FMD model since they assume that capital could be instantaneously shifted between the two sectors. They assumed, moreover, neoclassical constant-returns-to-scale technologies allowing for smooth capital-labour substitution in both sectors, and perfectly competitive assumptions, which ensured full-employment growth with saving determining investment. Yet the consideration of two sectors did make a difference: while in Solow's one-sector model convergence to a steady state path required extremely weak conditions, these models made convergence more difficult.

Under a variety of conditions, it has been found that unless the capital-labour ratio at all wage-rental ratios for the consumption goods sector is higher than the investment goods sector (the capital-intensity condition) convergence is difficult to obtain.⁵⁵ If this condition is found to be implausible, the neoclassical approach has serious problems of internal consistency,⁵⁶ aside from questions regarding the validity of its assumptions. By assuming perfectly malleable capital and therefore ruling out non-shiftability, moreover, the only real difference between the two sectors is the difference in factor intensity; indeed, if factor intensities are assumed to be the same between sectors the model collapses to a one-sector neoclassical model and the instability problem disappears. One may ask whether this model is an appropriate vehicle with which to study the consumption-investment distinction.

A second set of models examine Marx's analysis of expanded reproduction under conditions of surplus labour. Several models have assumed a given real wage and extended the one-sector neo-Marxian model of section 2, and found that allocation of capital which equalizes the rate of profit between sectors and ensures balanced growth. The model has also been used to explore the convergence to this equilibrium starting from a situation of different rates of profit and growth, allowing for relative prices to respond to excess demands and intersectoral profit differentials to result in differential rates of investment. Nikaido (1985) found a condition analogous to the neoclassical capital-intensity condition for obtaining convergence, making convergence difficult. But Flaschel and Semmler (1986) show that if capital flows respond also to changes in profit rates convergence is obtained more easily, while Dutt (1988) demonstrates that the Nikaido result depends on the assumption that wages are advanced, an assumption which becomes less relevant in economies dominated by fixed capital.

The model has been modified to allow for the state of the labour market to affect the real wage, as in Harris (1978) and Mukherji (1982); the latter, also allowing for labour-saving technological change in the investment sector, shows the possibility of instability in the model. Foley (1986) introduces lags in spending (as well as production and earnings) using Laplace transformations to examine the conditions for balanced growth in the Marxian model with two sectors. The introduction of lags in spending in Foley's analysis implies that it forsakes Say's law and is capable of handling problems of the lack of aggregate demand, which was examined by Marx in his study of the problem of realization, and subsequently stressed by Luxemburg (1913). The problem of demand is also relevant to Marx's analysis of the crisis of disproportionality caused by contraction of an overexpanded department not matched by a contracted of the underinvested department, leading to aggregate demand failures; however, two sector models have thus far not been useful for understanding this problem.

Demand problems are central to neo-Keynesian and Kalecki-Steindl two-sector models, extending the one-sector models of section 2. The neo-Keynesian model is to be found in Robinson (1956), while Kalecki-Steindl models have been explored by Taylor (1983, 1985) which stresses the luxury-basic goods distinction (see section 7) and Dutt (1988), which is useful for understanding the effect of power relations between different groups (workers, capitalists and the state) in determining relative prices, distribution and accumulation patterns. Since the Kalecki-Steindl models allow for the existence of excess capacity, they can be used for understanding the implications of an FMD-style expansion of the investment goods sector in capitalist and mixed economies when excess capacity exists.

We conclude with three remarks about these models. First, the models examined here can be seen as alternative closures [see Dutt (1988)] of a general two-sector framework, as in the case of the one-sector models. Second, there is a formal similarity between the models discussed here and some of the agriculture-industry models discussed in the previous section; their main difference is that here the investment good cannot be consumed, while in the other models the good which is the industrial investment good can also be consumed. Third, these models concentrate on the nature of products of the two sectors, but abstract from other important distinctions between them. For example, the investment good production can generate important technological spinoff effects throughout the economy in the manner we have discussed elsewhere in this paper (sections 3 and 8, for example), given the sophisticated nature of production technology in the sector. As Chakravarty (1987) has argued, this not only strengthens the case for emphasis on the investment good sector in a closed economy, but helps to extend it to an open economy as well, since it the production, and not mere use, of investment goods that leads to technological improvements.

6. Open economy issues

Although open economic issues have inevitably cropped up in our discussion we have not systematically introduced open economy considerations into our analysis, nor considered sectoral divisions featuring open economy issues; this section considers briefly several types of sectoral distinctions which have been highlighted in open economy discussions of LDCs. We may conveniently organize our discussion around two central issues concerning the relation between development and international economic relations: the effects of trade expansion and of foreign exchange shortages on LDCs.

On the first issue, the mainstream neoclassical approach stresses the gains from trade due to greater specialization, but there are other approaches as well, which make the gains depend on the types of goods traded. Smith (1776) referred to the favourable productivity effects (due to economies of scale and technological change) of the widening of the extent of the market and the scope for division of labour brought on by trade expansion; since this is likely to be more important for advanced manufactures its importance for many LDCs is limited to the so called newly-industrializing countries. He also referred to the benefits of expanded markets or the vent for surplus production capacity which would have been underutilized in the absence of international trade.⁶⁷ Harold Innis and other Canadian economists and economic historians have also added the staples theory which sees the exploitation of a dominant natural resource for external markets as leading to economic growth.⁶⁸ But expansion of the export sector has not always been viewed favourably: the increase in primary exports has been seen to shift the production structure of the economy away from high-processing manufacturing, the engine of growth,⁶⁹ to goods which have inelastic world demands and face falling world prices. Many of these issues have been discussed in the context of North-South models referred to in section 4, but here we will consider a illustrative examples of these problems in terms of variants of the Heckscher-Ohlin-Samuelson (HOS) model, and the nontradable goods model.

The basic HOS approach considers a static two-factor (labour and capital, quantities given in physical amounts), two-good (both produced and traded, one imported and the other exported)⁷⁰ model of a undistorted perfectly competitive economy with given neoclassical technology and community indifference curves. For a small economy (with given terms of trade) it can be shown that if the production of the export good increases (due to a reduction in of trade

restrictions, technological improvements or increases in factor endowments) the economy will be better off.⁷¹

This conclusion, however, depends on the small-country and the other assumptions of the basic HOS model. There are numerous examples in which an expansion in the export sector can result in a loss to the economy.⁷² First, if the economy is a large one so that its terms of trade declines with an increase in its exports, technological change (of most types) in the export sector, or increase in the endowment of the factor used intensively by the export sector (by the Rybczynski (1955) theorem) would expand the export sector, but through a terms of trade loss, the economy would be immiserized [see Bhagwati (1958)]. Second, even if the country is small, if there are domestic distortions in the economy which make the economy produce more of the export good than is optimal, an increase in the size of the export sector due to a reduction of trade restrictions would reduce welfare by exacerbating the effects of the distortion on the economy: an example is the Lewis (1954) distortion in which the 'wage' in the peasant export sector is given by the average, rather than the marginal, product. Third, Chichilnisky (1981) has considered a more substantial modification of the HOS model, assuming fixed coefficients and factor-price dependent factor supplies to examine the problems of export expansion. Although her's is a two-country North-South model it suffices here to examine only the South, which produces two goods, a basic export good and an investment or luxury good which is imported and for which there is an exogenously given level of demand. Chichilnisky assumes technological dualism (ie., the investment good sector is significantly more capital intensive than the basic good sector), and abundant labour (ie., a high wage responsiveness of labour supply) in the South to show that increase in the level of demand for investment goods in the North

which increases Southern exports of basic goods to the North, and worsen the terms of trade and the purchasing power of wages of the South. This happens because under the conditions described, the income effect of a rise in real wages will increase employment and the consumption of the basic good, reducing exports; a rise in the latter therefore requires a fall in the former.

Dynamic extensions of these mainstream models could also imply problems for LDCs. If manufacturing production is subject to increasing returns to scale and/or learning effects (which can have spinoff effects to other sectors as well) and primary products are not, greater exports of the latter from greater production and transfer of resources from manufactures will lead to slower rates of productivity increase in the economy. As already noted above, these effects have been noted by Galtung (1971) and Singer (1950); they have been modelled in Krugman (1981) and Dutt (1986a), although in models which differ from the HOS models (although the HOS-type models could be extended dynamically to produce the same effects).

The nontradables model, instead of distinguishing between export and import sectors, distinguishes between tradables (which can be exports or imports, but can also include close substitutes of these as well, even if not actually trade) and nontradables, which generally consists of services but could include other products as well. Developed by Salter (1959) and Swan (1960), the initial models had tradable prices determined broadly by the world market (a small country assumption being made) subject only to tariffs and other trade restrictions, transport costs, and exchange rates, while nontradable prices by domestic demand and supply.

This model has been modified to examine the consequences of an effect of an increase in the production of a traded good on the rest of the economy: the so-

called "Dutch disease" is the main real-world example.⁷³ Corden and Neary (1982) consider a three sector model with a booming sector, a lagging sector (both producing tradables) and a nontradables sector, each sector using one specific factor and intersectorally mobile labour to produce its output in perfectly competitive markets. A technological improvement in the booming sector raises income there, which is partly spent on the nontradable sector, raising its relative price; this draws resources away from the tradables sectors to the nontradables sector. Additionally, the rise in the demand for labour in the booming sector induces a movement in labour from the lagging and nontradables sector. The lagging sector loses labour due to both effects, and if it is the industrial sector, there is de-industrialization. A survey of these results and extensions to consider more non-specific factors, several lagging sectors, international factor mobility, and other issues, is available in Corden (1984).

Structuralist versions of the model, placing greater emphasis on the structural characteristics of LDCs, and departing from neoclassical assumptions, are also available. Boutros-Ghali (1981) and Taylor (1983) consider a model of a mineral-exporting economy which exports a mineral similar to the Taylor (1982, 1983) model. The output of the mineral sector, entirely exported, is fixed in the short run. There are two other goods produced in the economy, a non-traded intermediate-cum-consumption good (infrastructure) assumed to be in fixed supply (its price varies to clear the market), and a manufactured good which is consumed domestically and also exported (with exports depending on relative prices), produced under conditions of excess capacity with a price determined as a markup on prime costs (its quantity varies to clear the market). Infrastructure is used in the production of the manufactured good and the mineral, labour is used in producing all three goods, and imported intermediates are used in the

manufactured goods sector; fixed coefficients of production exist everywhere. The model shows that an increase in mineral exports may reduce the level of production of the manufactured good by drawing away infrastructure from it: the possibility of this increases if the nontradable is not important as a consumer good (so that that use cannot be squeezed much by price increases). The increase in the price of infrastructure also raises the price of the manufactured good, reducing its exports. Thus greater mineral exports may well imply a reduced diversification in both production structure and exports.

The second issue, the shortage of foreign exchange in the presence of relatively inelastic import requirements, has been seen in structuralist and other circles as an important factor responsible for inflation, balance of payments and stagnation problems in LDCs [see Furtado (1971, chap. 5) and Hirschman (1958, chap. 9) for example]. The foreign exchange constrained has been introduced into the literature with the two gap model, which adds to the standard saving-constrained economy a foreign exchange constraint.⁷⁴ Although the model can be represented in one sector notation with the economy producing one good which can be domestically used and exported, and much of the literature has proceeded in these terms, we examine a two-sector formulation where one sector produces a home good and the other an export good following Taylor (1971, 1979). The export good could more generally be thought of as a traded good which could be imported, so that we think of import-substitution rather than export expansion.

The economy has given stocks of capital in the two sectors, and given capital output ratios fix their outputs; both sectors have fixed prices. Intermediate goods have to be imported as a fixed proportion of these outputs, a constant fraction of total output is saved, and a fraction of total investment goods is

imported. Then the foreign exchange restriction implies that total imports of investment and intermediate goods must be less than the output of the export sector and foreign capital inflows; this implies that total investment in the economy must lie below a rising (foreign exchange) line relating total investment to the foreign inflow. The saving restriction implies that investment must be less than the sum of domestic saving and the foreign capital inflow; this tells us that total investment must lie below a rising (savings) line relating total investment to the foreign inflow, which we call the saving line. As long as not all investment goods are imported, the foreign exchange line will be flatter than the saving line: if economies have a low level of foreign capital flow they will be constrained in their investment plans by the foreign exchange line so that they cannot grow faster because foreign exchange is not available to invest fast enough, and if the economy has higher capital flows the saving line will constrain the economy so that they cannot grow faster because it does not have more saving. The foreign exchange constrained economy will not be able to grow faster even if it can increase domestic savings.

The model can be used for analyzing whether an economy's growth rate is constrained by saving or foreign exchange for a given level of foreign capital inflow, and for analyzing the implications of greater foreign capital inflows. It can also be used for examining the implications and desirability of alternative patterns of investment: investment in the export sector will push up both lines, while investment in the home goods will push up the saving line but push down the foreign exchange line. This assumes, of course, that exports are supply determined, and that increasing supplies will be absorbed by world markets; the import-substituting interpretation is more sensible when exports are limited by world demand. A key structuralist idea was that the world demand for exports is

limited, hence the stress on import substitution. If the possibilities of even this are limited, the foreign-exchange constraint will be hard to remove.

Taylor (1971) has used a dynamic optimizing framework to examine the optimal choice of foreign capital flows and sectoral investment levels to maximize the present discounted value of total consumption less the cost of foreign capital at its shadow valuation, by introducing some additional constraints. The usual solution is to have high capital inflows initially, and then reduce such flows through time; it also implies the initial specialization of investment in the export or import-substituting sector, corroborating the importance given to these sectors by Latin American structuralists.

A problem with the model discussed here is that it does not examine what happens when one or more of the constraints is binding. If it is saving (foreign exchange) constrained the economy will have an excess of foreign exchange (savings); it does not examine what happens to this foreign exchange (savings) and how it affects the other relations of the model. Bacha (1984) has examined a one sector version of the two gap model to consider alternative sets of possibilities, allowing the economy to have trade surpluses and less-than-full capacity utilization rates.

The two-gap approach has been criticized because, as Little (1982) points out, it assumes world demand for exports to be limited, there are no consumption imports, and the import content of domestic production and investment is fixed, all of which are valid for the very short run, but never so for the long run. Findlay (1971) has shown, however, that if imports are allowed for consumption purposes, increases in domestic saving rates will raise the growth rate, but there will be an upper asymptote to how far it can be pushed, and that this condition is unchanged if imported and domestic inputs are substitutable in

production and investment. The crucial assumption for this result is that the foreign offer curve is unit elastic. In fact, if the foreign offer curve turns down instead of just becoming flat, raising the rate of saving could result in lowering the rate of growth after a point. Foreign exchange constraints are real, relaxing the rigid structuralist assumptions does remove discontinuities, but the general message remains.

7. Income distribution and the luxury-basics balance

One of the central themes in the literature on economic development and stagnation in recent years is the interaction of growth and income distribution. In this section we bring this into sharper focus by distinguishing between basic or wage goods and luxury goods.

This distinction has played an important role in economic analysis of the past, appearing in the schemes of both Ricardo (1817) and Marx (1867). But its importance and its relationship to the growth-distribution interaction was stressed mainly by Sismondi, who argued that an unequal distribution would hurt growth by depressing markets for mass manufactured goods: poor workers could afford only essentials, while the few rich would only buy better-worked and more finished quality goods and even foreign luxuries.⁷⁵ These ideas have found echoes in LDCs of today, particularly in Brazil, Mexico, and India. For Latin America, it has been pointed out that a worsening of income distribution resulted in the growth of a modern sector producing luxury goods (mainly consumer durables); while this caused rapid growth initially, the growing inequality implied narrow markets, the emergence of excess capacity in these industries, so that the growth process was short-lived. Latin American structuralists wanted the demand for these dynamic sectors to be increased, some by further

concentrating incomes at the top and others by expanding the purchasing power of the middle class.⁷⁶ While these recommendations were opposed to Sismondi the Indian discussions were closer to him. The stagnation in the Indian economy since the mid-sixties was linked in part to the decline in incentives to investment due to the low size markets caused by an unequal distribution of income.⁷⁷ Workers were too poor to provide a mass market for mass manufactured goods, and the rich did provide a market for luxury consumer durables, but this was a fickle market; this problem was overcome in advanced countries by continuous product innovations, but the rich were not rich enough to keep buying, and the generally inefficient industries were not dynamic enough to keep innovating. Generalized excess capacity emerged, slowing down growth. To enlarge the market for mass-consumption goods a more equal distribution was called for.

It should be noted that the study of the relation between growth and income distribution does not necessitate the division of the economy into basic and luxury goods, and indeed, much of the debates in the historical or more recent literature did not invoke this distinction. For instance, the one-sector models review in section 2 can address the issue: the neo-Marxian model implies that a higher real wage reduces capitalist saving and capital accumulation, while the Kalecki-Steindl model implies that a lower markup increases the real wage, aggregate consumption demand, investment incentives and accumulation. Nevertheless not all issues can be handled by these models, and several models have been constructed in recent years stressing the basic-luxuries distinction.⁷⁸

Taylor and Bacha's (1976) pioneering model distinguishes between two classes of workers - skilled who received a higher wage and saved and unskilled who did not save - and measures inequality in terms of the share of wages going to the skilled workers (profit income is entirely saved); both types of workers are

available in unlimited supply (implying zero costs of skill formation) and there is a fixed productivity differential between them. The economy produces three goods - an investment good, a luxury good consumed by skilled workers and a wage good consumed by the unskilled workers (there are also exogenous demands for the consumption goods). In the short run for a given shiftable capital stock and a fixed investment demand the equilibrium values of the variables are determined to clear markets with full capacity utilization of the available capital. In the long run, investment demand is assumed to depend on the growth rate of the luxury goods sector and its relative size in the economy: the result is that an increase in luxury good production generates growth through the investment function, which leads to increased inequality and further increases in luxury good production, formalizing the early Latin pattern of growth. This unequalizing spiral result depends crucially on the nature of the investment function, that is, the assumption that animal spirits of investors are aroused with the expansion of the luxury-goods sector. But if this dynamism of the luxury goods sector faltered and excess capacities emerged (both ruled out in the model), the unequalizing growth process could terminate as it did in the Latin American case.

De Janvrey and Sadoulet (1983) combine the luxury and investment goods sector so that the economy produces two goods. They examine the question of income distribution by distinguishing between two groups - workers who have a fixed wage due to surplus labour and managers whose wage is determined by the model; this wage ratio measures inequality. Workers and managers save constant fractions of their income, and all profit income (from fixed markups) is also saved; all saving is investment and the allocation of investment between sectors is exogenously fixed. The basics have income inelastic demands and both workers and managers have the same consumption functions. The authors find that if the level

of inequality is above a threshold level the economy is 'social disarticulated', that is increased inequality is associated with a relative increase in the production of the luxury-cum-investment good. Under social articulation wages create the bulk of demand for both sectors of the economy, but under social disarticulation wages do not form a large part of the market for the luxury-cum-investment good, so that a growth process allocating investment largely toward that sector can work only by increasing inequality. For a socially disarticulated economy, equalizing growth requires either that progressive income distribution policies are pursued, or investment is directed primarily towards the basic goods sector; only socially articulated economies can grow with increasing equality by allocating investment primarily to the other sector.

The De Janvrey-Sadoulet contribution is an important one, if only for developing formally the concept of social articulation, and for finding conditions under which it will occur. However, they use a rather special, and perhaps strange, model. Rattso (1986b) has examined the closing rules implicit in the model and shown that demand-supply balance in the basic goods sector comes about through variations in the wage paid to managers; the story behind this has not been told, however.^{7*} Standaert (1986) has shown that the consumption functions reflect money illusion, and when this is removed, the possibility of social disarticulation depends on the type of model closure assumed. Finally, De Janvrey and Sadoulet do not explore the implications on the growth rate of the economy of alternative patterns of investment, or of the determinants of the pattern of investment.

While De Janvrey and Sadoulet are more interested in examining the income distributional consequences of growth, Taylor (1983, 1985) has developed models aimed more at examining the growth consequences of income distribution changes.

There are two goods - a wage good and a luxury-cum-investment good, but only one type of worker in the economy and inequality is measured in terms of the profit share. A Kalecki-Steindl closure is used for both sectors: excess capacities exist and markup pricing is assumed, so that markets are quantity-cleared. Wages are entirely consumed and a fraction of profit income is saved and a higher proportion of spending out of profits is on the luxury good [Taylor (1985) simplifies by assuming no wage good consumption out of profits]; investment demand in each sector depends on its rate of profit. A shift parameter is introduced into the consumption allocation equations which could represent consumption taxes: an increase in it shifts spending from the luxury to the wage good and to examine the relationship between growth and income distribution, this demand parameter is shifted. Taylor (1985), on account of its simple assumptions produces the simplest results: the effect the shift on the (balanced growth) rate depends on the responsiveness parameters of the investment function, while the effect on income distribution depends on the markup rates and labour productivity parameters. Thus a demand shift to the luxury goods sector could reduce the rate of growth (if the wage-good investment function responds more strongly to the rate of profit) and worsen the income distribution, although a Taylor-Bacha result is also possible.

The handful of models surveyed here raise important issues about different types of model closures and different ways of measuring inequality, but as theoretical models they can only make stories precise and point to the diversity of theoretical possibilities. To gain an understanding of what they can tell us about real economies, one must also look carefully at the structure of actual economies. Not much work relevant to the subject of this section has been done; Wells's (1977) on Brazil and Lustig's (1980, 1982) on Mexico are exceptions.

Wells shows that consumer durables are purchased also by low income groups (partly financed by consumer credit and partly at the expense of 'necessary' goods), and that increasing the share of the highest income groups will not increase the demand for these goods. Lustig's work also shows that low income groups often consume a fair amount of consumer durables and have sometimes have a higher income elasticities of demand for them suggesting that low income groups could provide a market for durables. She shows further that durables have high income elasticities of demand, so that their demand need not taper off as believed by some structuralists, and that luxury goods sectors are not as dynamic (in the sense of having strong linkage effects and scale economies) as sometimes thought.

8. Service, nonmarket, and unproductive sectors

This section examines a variety of attempts to relate low rates of economic growth to the relative expansion of some sectors of the economy, which have alternately been called service, nonmarket, and unproductive sectors (distinguished, respectively, from the manufacturing and agricultural, market, and productive sectors). Although the sectors and mechanisms are different we discuss them together in this section because they are all popular as explanations of stagnation and de-industrialization in advanced industrial economies in recent years, especially for the UK and the US; the issues may well be of relevance to LDCs as well, and in several cases have been applied to them.

The relative growth of the service sector has been viewed with concern in the US and UK; this may seem surprising since this is in accord with the normal pattern of structural changes. However the shift has been seen to result from the failure of domestic industry to stand its ground in the face of foreign

competition, especially from Japan, due to a combination of factors.⁶⁰ Whether a result of inevitable tendencies or due to specific failures, theory does provide cause for alarm.

Baumol (1967) argues that successive and cumulative increases in productivity in manufacturing are possible since labour is mainly an instrument in production, but in services where labour is itself the end product, this is not the case;⁶¹ this fits with stylized facts as well. To model the implications of this, he examines a one factor (fully-employed labour) and two sector model in which manufacturing experiences productivity growth at a constant rate and in services productivity is constant; money wages throughout the economy increase with productivity in manufacturing, so that relative average costs (and price, under perfectly competitive equilibrium) in the service sector will rise without limit. If the magnitude of relative output in the two sectors is maintained (due to sufficient price inelasticity or income elasticity for services, or government intervention), over time services will take a larger part of the labour force and manufacturing employment will decline, and the rate of growth of total output per capita fall, eventually reaching zero. The key to stagnation must lie in what exactly holds up the demand for services.

While Baumol discusses differential productivity growth, Cohen and Zysman (1987) emphasize direct linkage effects, although not formally. While many services that are linked to manufacturing - such as wholesaling, retailing and advertising - would not directly be affected by importing manufactures rather than by producing them, there are some services such as design and engineering services, repair and maintenance of plant and equipment, finance and insurance, payroll, inventory and accounting services, etc. which would be hurt; in particular, 'high tech' services are linked to manufacturing production. They use

this analysis to argue that in the US a switch from manufacturing to services would have undesirable consequences.²² The linkage effects they consider have to be assessed more carefully to ascertain whether the import of manufactures would not generate similar consequences.

The technological linkage argument is similar to the popular idea that the manufacturing sector is the engine of growth of the economy, which goes behind the dynamics of technological change. It argues that a faster rate of growth of manufacturing increases the rate of growth of the economy as a whole by speeding up the rate of productivity change in manufacturing, which has spinoff effects on productivity change in other sectors; empirical support has been given by Kaldor (1966) and Cripps and Tarling (1973) by regressing the rate of growth of the manufacturing sector on the overall rate of growth and finding a positive effect. More detailed investigations regarding the two steps of the argument are also available. Regarding the link between faster rates of growth and manufacturing productivity, a large literature has developed around the so-called Verdoorn law: estimates by Kaldor and others have yielded positive coefficients, but criticism by Rowthorn (1975) and others has followed.²³ Theoretically, arguments have been made in terms of the economies of longer production runs, demand effects as discussed by Schmookler (1966), and learning by doing as emphasized by Arrow (1962). Regarding spinoff effects, technological change in manufacturing industries (chemical and electrical and nonelectrical machinery have been single out) producing intermediates, by reducing costs and prices of inputs and improving their quality, are seen as generating productivity effects on other sectors.

For LDCs, where services sectors are often large as hosts of the disguisedly employed, the issues may turn out to be somewhat different and the expansion of

the service sector can be thought of as a reverse Lewis-process, due to a reduction of advanced sector employment and shift to a low-productivity backward sector; service sector expansion would be a symptom, not a cause of economic decline. But in part, the problems could be similar to those of advanced economies: international demonstration effects, and high levels of income inequality, may expand the demand for services in LDCs, and this may cause shifts away from manufacturing. Thus LDCs could suffer from the problems of service sector expansion and attendant manufacturing sector contraction (at least in relative terms) without having the luxury of high per capita incomes.

Turning to the nonmarket sector, Bacon and Eltis (1976) explain the slowdown in British economic growth in terms of its relative expansion, distinguishing between the market sector, which produces output actually sold in markets, and the nonmarket sector which produced output provided by the government.** An expansion of the nonmarket sector increases the purchases of marketed output by the nonmarket sector (for example those employed in that sector), and if the economy is close to full capacity or full employment of labour and consumption spending (mostly by workers) cannot be reduced due to wage resistance, investment spending would be crowded out, which would adversely affecting growth.**

Hadjimatheou and Skouras (1979) and Bacon and Eltis (1979) debated the empirical issues for Britain, but what is more important for our purposes, the theoretical validity of the argument; the latter defended their theoretical consistency but not its universal applicability. Adachi (1984) has developed a model, carefully distinguishing between short-run and long-run impacts of an increase in the nonmarket sector. In the short run (with given capital stock and labour force) the effect of an increase in government spending on the nonmarket sector is shown to depend on whether or not full employment exists and the

government budget is balanced. In the long-run analysis, investment depends on the after tax rate of profits and animal spirits, the government spends to try to maintain full employment, and the ratio of government spending on the market and nonmarket sector is assumed to be constant. A steady-state full-employment growth path is derived with which it is possible to examine the long-run implications of parametric changes. Of greatest interest, Adachi assumes a low level of animal spirits and a fixed level below which the real wage cannot fall, and is able to show that the economy can travel along a non-steady-state path in which inflation increases, the rate of profit and the rate of accumulation falls, and nonmarket sector employment grows. However, the cause of stagflation does not lie in nonmarket expansion, but in low animal spirits, an inflation barrier, and attempts by the government to control inflation and unemployment by changing government expenditure.

Adachi's analysis either examines the effects of parametric changes which change the size of the nonmarket sector, or considers a specific dynamic story to produce the Bacon-Eltis result. To examine more generally the explanations of nonmarket sector growth which could initiate a Bacon-Eltis effect, Gemmell (1987) has used a competitive 2×2 trade-theoretic model with nontraded output, identifying nonmarket outputs as nontradables and market outputs as tradables. Both sectors use capital and labour for production, and the nonmarket sector is assumed to have a higher capital intensity and a low price (or more appropriately since these are not sold, implicit price or tax) elasticity of demand. Growth, reflected by a rise in the capital-labour endowment of the economy, in this model, assuming homothetic indifference curves, is shown to increase the amount of resources devoted to nonmarketed outputs.

The Bacon-Eltis approach, while applied initially to the UK has been applied to international comparisons [Gemmell, 1983; Landau, 1983] and to the study of less developed economies [see Gemmell's (1982) application to Egypt]. Kuznets (1988) has argued that the small size of the public sector (as measured by public consumption as a fraction of GDP) was one of the main characteristics of the successful Southeast Asian (Japan-South Korea-Taiwan) model of development. There have also been numerous studies for LDCs involving one type of nonmarket sector growth, that of defense spending [see Faini, Annez and Taylor (1984), for example, showing a negative impact of this type of spending on the growth rate for LDCs]. Finally, along similar lines - although this refers to the composition rather than the size of nonmarket activity - it has been argued [see Ahluwalia (1986)] that an expansion in public sector employment in India has interfered with the expansion of infrastructural investment in agriculture and power generation.

While the analysis has shown that relative growth in the nonmarket sector can reduce the rate of growth under some assumptions, and there may even be some empirical evidence consistent with this hypothesis, there are good reasons to believe that one should not think of this as a general law. It is possible that such expansion may have favourable technological effects due to spillover effects on research, and improvement of education (although its relevance to LDCs with graduate unemployment is questionable); further, as Taylor (1987) drawing on a number of LDC country studies in a World Institute of Development Economics Research (WIDER) project and Chakravarty (1987) in considering Indian experience point out, government enterprise and provision of infrastructure (irrigation, for example) is significantly related to private investment in that sector. Moreover, in economies with demand problems [and there seem to be several, at

least for some periods of time, in the WIDER sample reviewed by Taylor (1987)) nonmarket expansion can promote growth by generating more demand.⁶⁶ In these cases the expansion of the nonmarket sector crowds in private investment rather than crowding it out as in Bacon-Eltis.

The productive-unproductive distinction has had a long history in economics: it was used - although not always in the same sense - by Quesnay (1757), Smith (1776), Marx (1867) and Baran and Sweezy (1966), to name just a few.⁶⁷ Wolff (1987), using Marx's definition which takes productive labour to be engaged in actual production and unproductive labour to be engaged in circulation activity, breaks down sectors of the US economy into these two types of sectors and shows that in postwar period there has been an increase in the level of unproductive activity, and this has been accompanied by declining productivity and real wage growth.

To explain this Wolff considers a two-sector model - where output in the productive and unproductive sectors are produced with capital (produced by the productive sector), labour and intermediate inputs purchased from the other sector. Fixed constant coefficients are assumed in the unproductive sector (so that technological change is ruled out), the output of which is fixed proportion of productive output. Level of output in the productive sector depends on capital and productive labour only and unproductive labour and inputs are used as a fixed proportion of productive output, and there is a given rate of neutral technological change over time. A fixed fraction of the final product, equal to final output only of the productive sector, is saved and entirely invested and the rate of growth of labour is fixed exogenously. Assuming perfectly competitive conditions (and the full employment of labour and capital) Wolff shows that over time the rate of growth of labour productivity falls and the

ratio of unproductive labour to total labour increases. Since productivity in the productive sector grows over time, but unproductive inputs enter into production with fixed proportions, unproductive employment as a percentage of total employment rises over time; this transfer of labour (and capital) to the technologically stagnant sector of the economy reduces the growth of overall productivity in the economy.

While Wolff tries to model the productive-unproductive distinction after Marx, he actually goes much further by assuming that unproductive inputs do not actually add to production in the productive sector (in Marx unproductive inputs could, for instance by expanding markets, add to output) and that there is no technological change in the unproductive sector (unlike Marx). This last assumption is a key one in the model, and makes it very similar in structure and results, to Baumol's model discussed above.** Further, the assumptions of full employment and no market problems, make the model rather un-Marxian. It may have been more Marxian to assume a neo-Marxian closure with a fixed real wage or share; in this case increased unproductive activity could be seen as a reduction from the surplus generated in the productive sector, which reduces saving and investment. Demand problems can be introduced with a Kalecki-Steindl closure which has desired accumulation functions in the two sectors. Such a model is considered by Dutt (1987a), where given markups are assumed for each sector. The model shows that economy can be on a growth path in which growth in productive activity accelerates with an increase in the relative capital stock of the unproductive sector, and an increase in unproductive activity (due to increases in the ratio of unproductive labour to output in the two sectors or intermediate use of the unproductive good in the productive sector) results in a steady state increase in the rate of growth due to the greater demand generated by the

expansion of employment in the unproductive sector. If greater unproductive expenditure also reduces savings by capitalists and the investment parameters, there will be a still greater increase in the growth rate. These results are exactly the opposite of those obtained by Wolff, and have the properties discussed by Baran and Sweezy (1966) in their analysis of the problem. It follows, therefore, that the nature of the closure matters, and no blanket statements are possible.**

9. Conclusion

We have covered a vast territory by summarizing some of the main contributions to the literature on sectoral balance; it is thus unnecessary to summarize our summary. Instead we conclude with three comments that follow from our survey.

1. While several important issues concerning the development of LDCs can be handled within a one-sector framework with one-sector models, there are many issues and problems that can only be addressed with the explicit recognition of more sectors than one. In particular, issues relating to structural change reflecting changes in sectoral composition, and the problems or benefits of differential rates of growth between different sector necessitate analysis in a multi-sector context. The same is true for the analysis growth problems resulting from the inadequate expansion particular sectors such as the agricultural, investment goods and some export sectors, or the problems resulting from the overexpansion of services, luxury goods, and some export sectors, to which we have devoted much space in this paper.

2. What type of sectoral distinction to emphasize obviously depends on the type of question being asked as well as the type of economy being studied. All the distinctions emphasized in the paper are important for LDCs, and although for

theoretical purposes we may discuss their consequences separately, discussions of for actual LDC experience may have to examine several different distinctions together. Emphasizing just one type of distinction may imply neglecting many important issues concerning the growth process and income distributional tendencies in a particular economy.

3. For each type of distinction we have considered, the exact stories that we have told, and their policy implications, have been seen to depend on exactly what type of 'closure' we have used to portray the economy in question. What type of closure one adopts for an economy depends on how one views the structural characteristics of the economy. It is unlikely that all economies can be described by a model using the same closure, and the development literature suggests that even for the same economy sensible people may find different closures to be relevant. It is therefore important that we understand the implications of different types of closing rules to see what stories they can tell, rather than slavishly adhere to a single type of model for a country, and worse still, for all countries.

FOOTNOTES

1. The immobility of common factors between sectors creates the same effect.
2. Differences in these characteristics do not necessarily imply differences in products produced, although they usually have been taken to do so: agriculture uses land and exhibits constant returns, while manufacturing uses capital and exhibits increasing returns; services experiences low productivity growth while manufacturing experiences high productivity growth, etc.. One may, however, distinguish between large and small-scale sectors, exhibiting different returns to scale, for the same product.
3. Such as the intersectoral immobility of factors.
4. We are concerned with the balance between sectors, since balance within sectors is more appropriately considered in a survey of the problems of particular sectors.
5. See, for example, Kindleberger (1965, pp. 200-1) and Singer (1958) for a survey of some definitions.
6. See Syrquin (1987) for an assessment of possible imbalances in Colombia along these lines, and Ocampo and Villar (1988) for some questions on this method.
7. On policy matters we will examine the general policy implications of the theoretical models surveyed, but not examine specific guidelines on what sector to expand or contract in a given situation, and with what instruments to implement these changes. Hopefully, however, the theoretical discussion will be helpful in understanding actual country experiences and drawing specific policy inferences.
8. Short-run issues and their links with longer-run issues are discussed in Arida and Taylor (1988).
9. This format of surveying the literature distinguishes ours from a similar, but less comprehensive, survey by Taylor (1986), the format of which emphasizes differences in the theoretical structures of models.
10. More extended discussions are available, for example, in Kuznets (1966), Chenery and Syrquin (1975), Chenery (1979), Chenery, Robinson and Syrquin (1986), Rowthorn and Wells (1987) and Syrquin (1988). The listing here almost follows Taylor's (1986).
11. The facts reported here are observed from both cross-section and time-series data (except where specifically noted), and found from casual observation, econometric work and simulation studies.
12. Several other theoretical models to be considered later also provide explanations for some of the stylized facts.
13. See Dutt (1988a) for a fuller analysis.

14. See Marglin (1984) and Datt (1988a).

15. A more faithfully-neoclassical model would allow for factor substitution, remove any reference to classes, and introduce optimization in producing and saving decisions; these modifications, however, would not change these implications of the model. While this model emphasizes the limitation of labour supply growth, other non-produced inputs (land or other natural resources, or foreign exchange), with the absence of production substitution for these inputs could also serve as a similar constraint.

16. Allowing for variable coefficients would reduce the difference between the neo-Keynesian and Kalecki-Steindl models, and the relationship between growth and distribution would depend on the elasticity of substitution in production. Low elasticities would still produce the positive relation between growth and distribution.

17. For a discussion of these models see Pasinetti (1977). See also Dmitriev (1904) and Schwartz (1961).

18. See Chakravarty (1969) for a thorough discussion.

19. See Hawkins (1948) for an early analysis of the instability problem and Filippini (1983) for a recent discussion.

20. Surveys are available in Manne (1974), Taylor (1975) and Dervis, De Melo and Robinson (1982). We mention here only general multisector models which emphasize input-output linkages. Planning models for dual economies, for consumption-investment allocation, and for foreign exchange-constrained economies will be discussed in more detail later in the text.

21. See Dervis, De Melo and Robinson (1982), for example.

22. See Taylor, Sarkar and Rattso (1984) and Gibson, Lustig and Taylor (1986), for example.

23. The models of the type we shall discuss in later sections can thus be, and indeed often have been, applied to actual economies using particular parameter values, more sectors, and complications which usually take into account the specific structures of the economies.

24. While the notion of balance has been used in a variety of senses in the literature, including any desirable form of growth, growth which maintains some form of socio-economic 'balance', and overall macroeconomic 'balance' externally and internally (see Singer (1958), for example), we will confine our attention to issues of sectoral balance.

25. This follows an old tradition of realizing that Say's Law required some form of sectoral balance. For instance, Mill stated (cited by Nurkse, 1953) that "[e]very increase of production, if distributed without miscalculation among all kinds of produce in the proportion which private interest would dictate, creates, or rather constitutes its own demand" [Emphasis added]. Allyn Young (1928), Rosenstein-Rodan's teacher, also expressed a similar opinion when he wrote that

the "size of the market is determined and defined by the volume of production. If this statement needs any other qualification, it is that the conception of a market in this inclusive sense - an aggregate of productive activities, tied together by trade - carries with it the notion that there must be some sort of balance, that different productive activities must be proportional to each other" [Emphasis added].

26. The model shows why firms will not produce more, but can be formally extended to deal with Nurkse's concern, investment.

27. This is valid only under certain specifications of technology and factor supplies, including constant returns to scale and absence of externalities. See Sheahan (1958), Findlay (1959) and Dagnino-Pastore (1963). Johansen (1960b) has also shown, in the context of planning models, that if capital can substitute for labor in production at different rates in different sectors and the aggregate capita-labor ratio increases in the economy, or if technological change occurs at different rates in different sectors, the rule will have to be modified even with constant returns to scale and the absence of externalities.

28. There have been other criticisms of the balanced growth idea primarily on the ideological ground that it involves government intervention. See Bauer and Yamey (1957). We do not enter into this broad issue here.

29. As we shall see later below, models emphasizing demand problems are becoming more popular. In terms of the terminology of the theoretical models of section 2, the critics were taking a neoclassical, full-employment, view while the demand constrained approaches take a neo-Keynesian or Kalecki-Steindl view of the economy. With a neoclassical view, additional investment by the government or the private sector - along balanced growth lines - would crowd out other types of expenditure (possibly investment expenditure), while with a demand constrained view crowding in would occur. See also section 8, on nonmarket sectors.

30. See also Sheahan (1958, 1959), Findlay (1959) and Montias (1961) in this context. Note, however, that the third notion may be unaffected by this, to the extent that actual production, and not just the availability of the goods, is required for the generation of externalities.

31. Nurkse argued that his strategy of balanced growth could imply a decline in foreign trade, but in the long run would develop the LDC and make it join the ranks of industrialized nations whose trade with each other formed the bulk of world trade. Hence the doctrine of balanced growth was not antithetical to the gains from specialization through trade. Nurkse (1957, 1959a) reiterated these points and also warned against the dangers of excessive import substitution.

32. As Streeten (1963) pointed out, "[s]hortages create vested interests; they give rise to monopoly gains; people may get their fingers burnt by malinvestments and may get frightened by the growth of competition."

33. Bhatt (1965) has raised the question why the features found to exist for social overhead capital, such as long gestation lags and indivisibilities, cannot be extended to other industries as well. To be consistent balanced growth theorists must accept this criticism but argue on empirical grounds that

industries of this type are not common enough to warrant excessive creation of excess capacities all over the economy.

34. And some development strategies based on the bigu push argument may have - at considerable prices - forgotten about agriculture.

35. Thus Nurkse supports unbalanced expansion of social overheads - which would result in the unbalanced expansion of some manufacturing industries, at least: these measures do not take these into account. Lewis supports the balance expansion of agriculture as well: these studies leave that sector out.

36. Balanced growth, because of its emphasis on market failures due to externalities, has usually been associated with intervention and state planning [see Rosenstein-Rodan (1943, 1951), Nath (1962)], while unbalanced growth, possibly because of Hirschman's (1958) criticism of the abilities of government planners, has often been seen to be free market oriented.

37. A theory which shows this cannot be the standard neoclassical one where agents a rational maximizers private profits, since they would not take external effects into account. Some form of euphoric behaviour, based on animal spirits, for example, have to be introduced into the story. Nurkse (1953) pointed out that a wave of inventions created by Schumpeterian [see Schumpeter (1934)] entrepreneurs could result in balanced growth.

38. This is unsurprising for balanced growth. Owing to the importance of external effects and linkages in the unbalanced growth doctrine, government planners could also be required to decide on how much and exactly what kind of imbalance would be required, and to create such imbalances to elicit the required responses on the part of the private sector.

39. This follows Kuznets' (1961) discussion of the different types of contribution agriculture makes to economic growth.

40. See, for example, Cohen and Weitzman (1975) for the former issue and Mundle (1985) for the latter.

41. See Preobrazhensky (1965) and Mitra (1977), for example. However, Ellman (1975) has argued that food-price-induced wage reductions and consequent forced saving supported Soviet industrialization in contrast to a reduction in food prices.

42. See Chakravarty (1977, 1987), Mitra (1977), Raj (1976), Mundle (1985), and Datta (1986).

43. See Pasinetti (1960) and Casarosa (1985) for reformulations of Ricardo's model.

44. Since our emphasis is more on the ability of the models to analyse constraints on growth rather, we do not evaluate their ability to explain other features of development experience. For broader surveys of the so-called dual economy models see Dixit (1973) and Kanbur and McIntosh (1988). See also Mellor (1974).

45. See especially Lewis (1972).

46. See also Leeson (1979) for a summary and evaluation of a number of criticisms of the Lewis model, and Bharadwaj (1979) and Datta (1986) for criticisms of the model in terms of conditions in one labour surplus economy, India.

47. See also Berry and Soligo (1968) for an analysis of microbehaviour allowing for leisure-income choice implying this result.

48. This could be justified, perhaps, by some efficiency wage theory from recent developments in modern macroeconomics - see Akerlof and Yellen (1986) for example. Basu (1984) provides this type of justification. However, the efficiency wage would usually have to be in terms of the real wage or in terms of food, so the product wage in terms of manufactures could not be fixed this way unless the terms of trade was also assumed to be fixed.

49. See Bardhan (1973), Dutt (1984), and Datta (1986) for example.

50. See also Lipton (1977).

51. This controversy reveals the more general difficulties of choosing between different models on empirical grounds.

52. Lysy did not take the product-wage to be fixed, but either the money wage or the real-wage in terms of the price index (which was not the same as the product wage due to the existence of imported intermediates).

53. See Kalecki (1971, 1976).

54. In the terminology of section II.2 the model changes from one with a neo-Keynesian agricultural sector and Kalecki-Steindl industrial sector to neo-Keynesian (full capacity utilization) in both.

55. This was followed by several other contributions on the subject, dealing with optimal policies. See, for example, Blomqvist (1979), Basu (1984), Gang and Gangopadhyay (1987).

56. Jha and Lachler (1981) and Gupta (1986) consider the optimal growth properties of the model.

57. Vines's model is a model of North-South trade and therefore does not allow for interregional labour mobility.

58. This amount of control of the industrial sector may be possible only in socialist economies; in Sah and Stiglitz (1987) they show that in mixed-capitalist economies this type of policy may require some flexibility in international trading.

59. See also Mellor (1974).

60. Dobb (1960) and Kalecki (1972) also analyzed a similar type of problem.

61. See Taylor (1979) for a discussion of these issues.

62. This model is an example of the two-gap approach which we will consider in the next section.

63. See Brahmanand and Vakil (1956), Mellor (1974) and Chakravarty (1987), for example.

64. This is a part of a more general problem that was faced in the application of the model in India's mixed economy. See Bagchi (1970), for example.

65. It is not necessary. Sufficient for stability, without the factor-intensity condition, is a difference in saving rates out of wage and profit income and sufficient production substitution.

66. Further problems arise with the heterogeneity of capital goods. One set of problems have been discussed in the context of the capital controversies based on the neo-Ricardian (Sraffian) critique of neoclassical growth theory [see Harcourt (1972) and Bliss (1975)]. Another set of problems have been discussed in terms of the Hahn problem [Hahn (1966)] in perfect foresight models generating saddlepoint equilibria.

67. See Myint (1958). This approach has been applied particularly to underpopulated LDCs which do not have a developed industrial base and which therefore leave underutilized their natural resources. However, the recent tendency of semi-industrialized LDCs to actively seek markets abroad for industrial goods in the face of depressed domestic demand conditions can also be seen as an example of the vent for surplus approach, although with a new twist. A further modification of the approach, along IMF lines, would be to pursue absorption-reducing policies to create a surplus which can be exported to overcome balance of payments difficulties (and hopefully increase long-run growth).

68. See Watkins (1963) and Hirschman (1977). Hirschman argues that the characteristics of the resource in question dictates the effects of export expansion for the rest of the economy. Other things constant, those with greater forward and backward linkage effects, final demand linkages, fiscal linkages (ability of the government to tax the increased income base provided that it spends the resources on growth-promoting activities), and familiarity (less technological strangeness or alienness, which encourages foreign involvement and export in raw form), are better from the point of view of growth. Coffee seems to have been a good resource in several countries.

69. This has been discussed in section 3 above in the context of the balanced growth debate, and we shall return to it again in section 8.

70. Note that the two goods have no differences other than the fact that one happens to be exported and the other happens to be imported.

71. This is not a necessary condition, since technological change or factor endowment reducing the export sector will also improve welfare. In dynamic models the gain could be reflected in increases in the growth-rate of the economy as well. The effect on income distribution, by the Stolper-Samuelson (1941) theorem, however, would be ambiguous, and if this affects the growth rate, the effect on the growth rate would also be ambiguous in general.

72. For a fairly exhaustive survey see Bhagwati and Srinivasan (1983).

73. This refers to the negative impact on manufacturing of natural gas discoveries; an earlier comparable case of the effects of gold discoveries in Australia in the late 1850s on Australian industries was studied by Cairnes (1859).

74. See, for example, Chenery (1961, 1975), Chenery and Bruno (1962), McKinnon (1964), and Chenery and Strout (1966) for example.

75. See Bleaney (1978) for a brief discussion of Sismondi's ideas. Similar underconsumptionist ideas were developed by the Russian populists, although they did not emphasize the wage goods-luxuries distinction.

76. See Lustig (1980) for a discussion of these views. The many facets of these structuralist writings - relating to choice of techniques, foreign debt, etc., are being ignored here.

77. See Bagchi (1975), Nayyar (1978) and Dutt (1984a), for example.

78. Sraffa (1960) also drew attention to this distinction, arguing that luxury goods, because they did not enter into the production of other goods, were not necessary for the reproduction of the system.

79. The model assumes fixed markups and full capacity utilization; the implicit behaviour of firms is also not clear.

80. See Cohen and Zysman (1987) Rowthorn and Wells (1987), and Singh (1987), for example.

81. Baumol admits that this is a matter of degree than an absolute dichotomy, and that there are some manufactures which seem to be like services - such as luxury goods like fine pottery.

82. There are excellent historical examples which confirm these arguments. The economic might of Holland and the Italian city states based on services (trading, financing and transportation) succumbed to Britain's power based on her industrial revolution in manufacturing. Similarly, Britain's transformation from an industrial to a commercial power is sometimes thought to be a cause of her economic decline.

83. See Cornwall (1977) and Bairam (1987) for surveys.

84. The distinction, initially suggested by Johnston (1975), is clearly not the same as the goods-services distinction, since services can be sold in markets and goods can be supplied by the government rather than be sold; however, to the extent that governments generally provide many services, there is bound to be a fair degree of overlap.

85. Excess demand would also lead to inflationary and balance of payments difficulties

86. This was claimed by Benoit (1973) who found a significant, positive correlation between the share of production devoted to defense and the growth rate of non-military output.

87. It has been used in different senses by different people, and sometimes in different senses by the same person. Thus Quesnay considered the agricultural sector to be productive and manufacturing to be sterile. Smith (1776) used the distinction in two senses - one, to distinguish between employment for profit paid for from profits, and two, to distinguish between the production of durable goods and non-durable services. Marx (1867) also had two separate distinctions: in one, productive labour is involved in commodity production (in the sense of producing in order to sell) while unproductive labour is not; two, productive labour is involved in production proper, while unproductive labour is involved in circulation activities which are necessary for the exchange of commodities or the maintenance or transfer of their ownership. It is clear that these different distinctions are not the same, and all except one of Smith's is not the same as the goods-services distinction.

88. These models, in turn, have a structural affinity to the models of Simon (1947), Houthakker (1976) and Rowthorn and Wells (1987) discussed earlier, in that they examine the relative size of sectors and especially the allocation of labour between them with differential productivity growth and demand patterns (between different sectors) under full-employment conditions.

89. If the productive sector is given an engine-of-growth role and animal spirits are aroused by its relative expansion, even the Kalecki-Steindl model may imply that a growth in the unproductive sector is associated with stagnation; see Dutt (1987a). But here it is not unproductiveness, but inability to excite animal spirits, which is the source of the trouble.

REFERENCES

- Adachi, Hideyuki (1984). "On the economic implications of the growth of the non-market sector", Oxford Economic Papers, 36, 418-437.
- Adelman, Irma and Cynthia Taft Morris (1984). "Patterns of Economic Growth, 1850-1914, or Chenery-Syrquin in Historical Perspective", in Syrquin, Taylor and Westphal (1984).
- Adelman, Irma and Sherman Robinson (1988). "Income Distribution and Development: A Survey" in H. Chenery and T. N. Srinivasan, Handbook of Development Economics, Vol 2, forthcoming, Amsterdam: North-Holland.
- Ahluwalia, Isher J. (1986). "Industrial Growth in India: Performance and Prospects", 23(1), September, 1-18.
- Akerlof, George A. and Janet L. Yellen, ed., (1986). Efficiency wage models of the labor market, Cambridge: Cambridge University Press.
- Amano, Masanori (1980). "A Neoclassical Model of the Dual Economy with Capital Accumulation in Agriculture", Review of Economic Studies, 48, 933-944.
- Amano, Masanori (1983). "On the Harris-Todaro Model with Intersectoral Migration of Labour", Economica, 50, 311-323.
- Andrews, Margaret S. (1985a). "Agricultural terms of trade and distributional perversities in a neo-Ricardian model", Journal of Development Economics, 17, 117-129.
- Andrews, Margaret S. (1985b). "Profit, Rent and the Terms of Trade. A rejoinder", Journal of Development Economics, 17, 141-149.
- Arellano, P. (1981). "Do more jobs in the modern sector increase urban unemployment?", Journal of Development Economics, 8, 241-247.
- Arida, Persio and Lance Taylor (1988). "Development Macroeconomics", in Hollis Chenery and T. N. Srinivasan, eds., Handbook of Development Economics, Amsterdam: North-Holland.
- Arrighi, G. (1970). "Labour Supplies in Historical Perspective. A study of the Proletarianization of the African Peasantry in Rhodesia", Journal of Development Studies, 6(3), 197-234.
- Arrow, Kenneth J. (1962). "The Economic Implications of Learning by Doing", Review of Economic Studies, June.
- Bacha, Edmar L. (1984). "Growth with Limited Supplies of Foreign Exchange: A Reappraisal of the Two-Gap Model", in M. Syrquin, L. Taylor and L. Westphal, eds., Economic Structure and Performance: Essays in Honor of Hollis B. Chenery, New York: Academic Press.

- Bacon, Robert and Walter Eltis (1976). Britain's Economic Problem: Too Few Producers, 2nd ed., 1978, London: Macmillan.
- Bacon, Robert and Walter Eltis (1979). "The Measurement of the Growth of the Non-Market Sector and its Influence: A Reply to Hadjimatheou and Skouras", Economic Journal, 89, 402-415.
- Bagchi, Amiya K. (1970). "Long Term Constraints on India's Industrial Growth, 1951-1968", in E. A. G. Robinson and M. Kidron, Economic Development in South Asia, London: Macmillan.
- Bagchi, Amiya K. (1975). "Some characteristics of industrial growth in India", Economic and Political Weekly, February.
- Bairam, Erkin I. (1987). "The Verdoorn Law, Returns to Scale and Industrial Growth: A Review of the Literature", Australian Economic Papers, June, 20-42.
- Baran, Paul and Paul Sweezy (1966). Monopoly Capital, New York: Monthly Review Press.
- Bardhan, Pranab K. (1973). "A model of growth of capitalism in a dual agrarian economy", in J. Bhagwati and R. Eckaus, eds., Development and Planning, Cambridge, Mass.: MIT Press.
- Bartlett, William (1983). "On the Dynamic Instability of Induced-Migration Unemployment in a Dual Economy", Journal of Development Economics, 13, 85-95.
- Basu, Kaushik (1980). "Optimal policies in dual economies", Quarterly Journal of Economics, 94, 187-96.
- Basu, Kaushik (1984). The Less Developed Economy, Oxford: Basil Blackwell.
- Bauer, P. T. and B. S. Yamey (1957). The Economics of Underdeveloped Countries, Cambridge: Nisbet.
- Baumol, William J. (1967). "Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis", American Economic Review, 57, 185-96.
- Bell, Clive (1979). "The Behaviour of a Dual-Economy under Different 'Closing Rules'", Journal of Development Economics, 6, 47-72.
- Benoit, Emile (1973). Defense and Economic Growth in Developing Countries, Lexington, Mass.: Lexington Books.
- Berry, R. Albert and Ronald Soligo (1968). "Rural-Urban Migration, Agricultural Output, and the Supply Price of Labour in a Labour-Surplus Economy", Oxford Economic Papers, 230-249.
- Bhagwati, Jagdish (1958). "Immiserizing Growth: a Geometric Note", Review of Economic Studies.

Bhagwati, Jagdish N. and T. N. Srinivasan (1974). "On Reanalyzing the Harris-Todaro Model: Policy Rankings in the case of sector-specific sticky wages", American Economic Review, 64.

Bhagwati, Jagdish N. and T. N. Srinivasan (1983). Lectures on International Trade, Cambridge, Mass.: MIT Press.

Bhatia, Kul B. (1979). "Rural-urban Migration and Surplus Labour", Oxford Economic Papers, 403-414.

Bhatt, V. V. (1965). "Some Notes on Balanced and Unbalanced Growth", Economic Journal, March, 88-97.

Bleaney, M. F. (1976). Underconsumption Theories. A History and Critical Analysis, New York: International Publishers.

Bliss, Christopher J. (1975). Capital Theory and the Distribution of Income, Amsterdam: North-Holland.

Blomqvist, Ake G. (1978). "Urban Job Creating and Unemployment in LDCs: Todaro vs. Harris and Todaro", Journal of Development Economics, 5, 3-18.

Blomqvist, Ake G. (1979). "Urban unemployment and optimal tax policy in a small, open dual economy", Journal of Development Studies, 15.

Blomqvist, Ake G. (1986). "The Economics of Price Scissors: Comment", American Economic Review, 76(5), December, 1188-1191.

Bose, Sanjit (1968). "Optimal Growth and Investment Allocation", Review of Economic Studies, October, 465-480.

Boutros-Ghali, Youssef R. (1981). Essays on Structuralism and Development, Unpublished Ph. D. Dissertation, Massachusetts Institute of Technology.

Brahmanand, P. R. and C. N. Vakil (1956). Planning for an Expanding Economy, Bombay: Vora & Co.

Bukharin, Nikolay (1971). Economics of the Transformation Period, New York: Bergman Publishers.

Caballero, Jose Maria (1984). "Unequal pricing and unequal exchange between the peasant and capitalist economies", Cambridge Journal of Economics, 8, 347-359.

Caballero, Jose Maria and J. Mohan Rao (1988). "Agricultural Strategy", August, World Institute of Development Economics Research, Helsinki.

Cairnes, J. E. (1859). "The Australian Episode", Frazer's Magazine, repr. in F. Taussig, ed., Selected Readings in International Trade and Tariff Problems, New York: Ginn and Co., 1921.

Calvo, Guillermo A. (1978). "Urban unemployment and wage determination in LDCs:

trade unions in the Harris-Todaro model", International Economic Review, 19, 65-81.

Calvo, Guillermo A. And Stanislaw Wellisz (1978). "Supervision, loss of control and the optimum size of the firm", Journal of Political Economy, 86, 943-52.

Cardoso, Eliana (1981). "Food Supply and Inflation", Journal of Development Economics, 8, 269-84, June.

Carter, Michael R. (1986). "The Economics of Price Scissors: Comment", American Economic Review, 76(5), December, 1192-1194.

Casarosa, Carlo (1985). "The 'New View' of the Ricardian Theory of Distribution and Growth", in G. A. Carvale, ed., The Legacy of Ricardo, Oxford: Blackwell.

Chakravarty, Sukhamoy (1969). Capital and Development Planning, Cambridge, Mass.: MIT Press.

Chakravarty, Sukhamoy (1977). "Reflections on the Growth Process in the Indian Economy", in C. D. Wadhwa, ed., Some Problems of Economic Policy, New Delhi: Tata McGraw Hill.

Chakravarty, Sukhamoy (1987). Development Planning. The Indian Experience, Oxford: Clarendon Press.

Chenery, Hollis B. (1959). "The Interdependence of Investment Decisions", in M. Abramovitz et al., The Allocation of Economic Resources, Stanford: Stanford University Press.

Chenery, Hollis B. (1961). "Comparative advantage and development policy", American Economic Review, 51, 18-51.

Chenery, Hollis B. (1975). "The Structuralist Approach to Development Policy", American Economic Review, Papers and Proceedings, May, 310-316.

Chenery, Hollis B. (1979). "Economic Growth and Structural Change", in H. B. Chenery, Structural Change and Development Policy, Oxford: Oxford University Press.

Chenery, Hollis B. and Michael Bruno (1962). "Development Alternatives in an Open Economy: the Case of Israel", Economic Journal, 72, March, 79-103.

Chenery, Hollis B., Sherman Robinson and Moshe Syrquin, eds. (1986). Industrialization and Growth. A Comparative Study, Oxford: Oxford University Press.

Chenery, Hollis B. and T. N. Srinivasan, eds. (1988). Handbook of Development Economics, Amsterdam: North-Holland.

Chenery, Hollis B. and Alan Strout (1966). "Foreign Assistance and Economic Development", American Economic Review, 56, September, 679-733.

- Chenery, Hollis B. and Moshe Syrquin (1975). Patterns of Development, 1950-1970, London: Oxford University Press.
- Chenery, Hollis B. and Lance Taylor (1968). "Development Patters: Among Countries and Over Time", Review of Economics and Statistics, 50, November, 391-416.
- Chichilnisky, Graciela (1981). "Terms of Trade and Domestic Distribution: Export-led Growth with Abundant Labour", Journal of Development Economics, 8.
- Chichilnisky, Graciela and Lance Taylor (1980). "Agriculture and the rest of the economy: macroconnections and policy restraints", American Journal of Agricultural Economics, 62(2), 303-9.
- Clark, Colin (1940). Conditions of Economic Progress, London: Macmillan.
- Clark, Peter B. (1975). "Intersectoral Consistency and Macroeconomic Planning", in C. Blitzer, P. B. Clark and L. Taylor, eds., Economy-Wide Models and Development Planning, Oxford: Oxford University Press.
- Cohen, Jon S. and Martin Weitzman (1975). "A Marxian Model of Enclosures", Journal of Development Economics, 1, 287-336.
- Cohen, Stephen S. and John Zysman (1987). Manufacturing Matters: The Myth of a Post Industrial Economy, New York: Basic Books.
- Cooper, Charles (1983). "Extension of the Raj-Sen Model of Economic Growth", Oxford Economic Papers, 35, 170-85.
- Corden, W. M. (1984). "Booming Sector and Dutch Disease Economics: Survey and Consolidation", Oxford Economic Papers, 36, 359-380.
- Corden, W. M. and Ronald Findlay (1975). "Urban Unemployment, Intersectoral Capital Mobility and Development Policy", Economica, February, 59-78.
- Corden, W. M. and J. Peter Neary (1982). "Booming Sector and Deindustrialization in a Small Open Economy", Economic Journal, 92, 825-848.
- Cornwall, John (1977). Modern Capitalism. Its Growth and Transformation, New York: St. Martin's Press.
- Crafts, N. F. R. (1984). "Patterns of Development in Nineteenth Century Europe", Oxford Economic Papers, 36, November, 438-58.
- Cripps, T. F. and Tarling, R. J. (1973). Growth in Advanced Capitalist Economies, Cambridge: Cambridge University Press.
- Dagnino-Pastore, Jose Maria (1963). "Balanced Growth: An Interpretation", Oxford Economic Papers, 164-176.
- Datta, Anindya (1986). Growth and Equity. A critique of the Lewis-Kuznets tradition, Calcutta: Oxford University Press.

- de Janvrey, Alain and Elisabeth Sadoulet (1983). "Social Articulation as a Condition for Equitable Growth", Journal of Development Economics, 13, 275-303.
- Demery, David and Lionel Demery (1973). "Cross-Section Evidence of Balanced and Unbalanced Growth", Review of Economics and Statistics, 55, November, 459-464.
- Dervis, Kemal, Jaime de Melo and Sherman Robinson (1982). General equilibrium models for development policy, Cambridge: Cambridge University Press.
- Dixit, Avinash (1968). "Optimal Development in the Labour-Surplus Economy", Review of Economic Studies, 35.
- Dixit, Avinash (1969). "Marketable Surplus in Dual Development", Journal of Economic Theory, 1, 203-219.
- Dixit, Avinash (1970). "Growth Patterns in a Dual Economy", Oxford Economic Papers, 229-34.
- Dixit, Avinash (1973). "Models of Dual Economies", in J. A. Mirrlees and N. H. Stern, eds., Models of Economic Growth, New York: Wiley.
- Dimitriev, V. K. (1974). Economic Essays on Value, Competition and Utility, ed. D. M. Nuti, Cambridge: Cambridge University Press.
- Drandakis, E. M. (1963). "Factor Substitution in Two-Sector Growth Models", Review of Economic Studies, 30, October, 217-228.
- Dutt, Amitava K. (1984a). "Stagnation, income distribution and monopoly power", Cambridge Journal of Economics, 8, 25-40.
- Dutt, Amitava K. (1984b). "Rent, income distribution and growth in an underdeveloped agrarian economy", Journal of Development Economics, 15, 185-211.
- Dutt, Amitava K. (1986a). "Vertical trading and uneven development", Journal of Development Economics, 20, March, 339-359.
- Dutt, Amitava K. (1986b). "Stock Equilibrium in Flexprice Markets in Macromodels for Less Developed Economies", Journal of Development Economics, 21, 89-109.
- Dutt, Amitava K. (1987a). "Stagnation, growth and unproductive activity: a theoretical analysis", unpublished, Florida International University, October.
- Dutt, Amitava K. (1987b). "North-South models: A critical survey", unpublished, Florida International University.
- Dutt, Amitava K. (1988a), Growth, Distribution and Uneven Development, forthcoming.
- Dutt, Amitava K. (1988b). "Convergence and Equilibrium in Two Sector Models of Growth, Distribution and Prices", Zeitschrift für Nationalökonomie.

Ellman, Michael (1975). "Did the Agricultural Surplus Provide the Resources for the Increase in Investment in the USSR during the First Five Year Plan?" Economic Journal, 85, 844-64.

Enke, S. (1962). "Economic Development with Unlimited and Limited Supplies of Labour", Oxford Economic Papers, 158-172.

Faini, Riccardo, Patricia Annez and Lance Taylor (1984). "Defense Spending, Economic Structure and Growth: Evidence Among Countries and Over Time", Economic Development and Cultural Change, 487-498.

Fei, John C. H. and Gustav Ranis (1964). Development of the Labor Surplus Economy, Homewood, Illinois: Irwin.

Fei, John C. H. and Gustav Ranis (1966). "Agrarianism, Dualism and Economic Development", in I. Adelman and E. Thorbecke, eds., The Theory and Design of Economic Development, Baltimore: Johns Hopkins University Press.

Fields, Gary (1975). "Rural-Urban Migration, urban unemployment and underemployment, and job-search activity in LDCs, Journal of Development Economics, 2, 165-187.

Fields, Gary (1980). Poverty, Inequality, and Development, Cambridge: Cambridge University Press.

Filippini, Luigi (1983). "Price and Quantity Adjustment in a Dynamic Closed Model: The Dual Stability Theorem, Journal of Macroeconomics, 5(2), Spring, 186-196.

Findlay, Ronald (1959). "International specialization and the concept of balanced growth: comment", Quarterly Journal of Economics, 73, May, 339-346.

Findlay, Ronald (1971). "The 'Foreign Exchange Gap' and Growth in Developing Economies", in J. N. Bhagwati, et. al., eds., Trade, Balance of Payments and Growth, Amsterdam: North Holland.

Findlay, Ronald (1980). "The terms of trade and equilibrium growth in the world economy", American Economic Review, June.

Fisher, A. G. B. (1939). "Production, Primary, Secondary and Tertiary", Economic Record, 15, June, 24-38.

Flaschel, P. and W. Semmler (1986). "The Dynamic Equalization of Profit Rates for Input-Output Models with Fixed Capital", in W. Semmler, ed., Competition, Instability and Nonlinear Cycles, Berlin: Springer-Verlag.

Fleming, J. M. (1955). "External economies and the doctrine of balanced growth", Economic Journal, 65.

Foley, Duncan (1986). Money, Accumulation and Crisis, Chur: Harwood.

- Funatsu, Hideki (1988). "A Note on the Stability of the Harris-Todaro Model with Capital Mobility", Economica, 55, 119-121.
- Furtado, Celso (1954). "Capital formation and economic development", International Economic Papers, No. 4.
- Galtung, Johan (1971). "A Structural Theory of Imperialism", Journal of Peace Research, 81-117.
- Gang, Ira N. and Subhashis Gangopadhyay (1987). "Optimal policies in a dual economy with open unemployment and surplus labour", Oxford Economic Papers, 39, 378-387.
- Gemmell, Norman (1982). "The Role of the Non-market Sector in Egypt's Economic Growth, 1960-76", Oxford Economic Papers, 34, 207-223.
- Gemmell, Norman (1983). "International Comparisons of the Effects on Non-market Sector Growth", Journal of Comparative Economics, 7, 368-381.
- Gemmell, Norman (1987). "A Model of Unbalanced Growth: The Market versus the Non-Market Sector of the Economy", Oxford Economic Papers, 39, 253-267.
- Gerschenkron, Alexander (1951). A Dollar Index of Soviet Machinery Output, Santa Monica: Rand Corporation.
- Gersovitz, Mark (1974). "Aggregate Demand, the Wage Gap and Unemployment in LDCs", Journal of Development Economics, 1, 235-246, December.
- Gibson, Bill, Nora Lustig and Lance Taylor (1986). "Terms of Trade and Class Conflict in a Computable General Equilibrium Model for Mexico", Journal of Development Studies, 23(1), October, 40-59.
- Gibson, Bill and Darryl McLeod (1982). "Terms of Trade Policy in a Model with Non-produced Means of Production", Journal of Development Economics, 10, 31-45.
- Gibson, Bill and Darryl McLeod (1985). "Profit, rent and the terms of trade. A Reply", Journal of Development Economics, 17, 131-139.
- Godfrey, Martin (1979). "Rural-Urban Migration in a "Lewis-model" context", Manchester School, September, 230-47.
- Guha, Ashok (1969). "Accumulation, Innovation and Growth under conditions of Disguised Unemployment", Oxford Economic Papers, 360-71.
- Gunning, J. (1983). "Rationing in an open economy: Fix-price disequilibrium and two-gap models", European Economic Review, 23.
- Gupta, M. R. (1986). "Shadow Wage Rate in a Dynamic Harris-Todaro model", Oxford Economic Papers, 38, 131-140.
- Hadjimatheou, G. and A. Skouras (1979). "Britain's Economic Problems: The Growth of the Non-Market Sector?" Economic Journal, 85, 288-308.

Haessel, Walter (1978). "Macroeconomic Policy, Investment and Urban Unemployment in Less Developed Countries", American Journal of Agricultural Economics, February, 29-36.

Hahn, Frank H. (1966). "Equilibrium Dynamics with Heterogeneous Capital Goods", Quarterly Journal of Economics, 80.

Hamilton, Alexander (1791). Report on Manufactures, reprinted in Jacob E. Cooke, ed., The Reports of Alexander Hamilton, New York: Harper and Row, 1984.

Harcourt, Geoffrey C. (1972). Some Cambridge Controversies in the Theory of Capital, Cambridge: Cambridge University Press.

Harris, Donald J. (1972). "Economic Growth with Limited Import Capacity", Economic Development and Cultural Change.

Harris, John R. and Michael P. Todaro (1970). "Migration, Unemployment and Development: A Two-Sector Analysis", American Economic Review, 60, 126-42.

Hawkins, D. (1948). "Some conditions of macroeconomic stability", Econometrica, October.

Hirschman, Albert O. (1958). The Strategy of Economic Development, New Haven: Yale University Press.

Hirschman, Albert O. (1977). "A Generalized Linkage Approach to Development, with Special Reference to Staples", Economic Development and Cultural Change, vol 25, supplement, 67-98.

Hoffman, W. G. (1958). The Growth of Industrial Economies, Manchester: Manchester University Press.

Hornby, J. M. (1968). "Investment and trade policy in the dual economy", Economic Journal, 78, 96-107.

Houthakker, H. S. (1957). "An International Comparison of Household Expenditure Patterns: Commemorating the Centenary of Engel's law", Econometrica, 25, October, 532-51.

Houthakker, H. S. (1965). "On Some Determinants of Savings in the Developed and Underdeveloped Countries", in E. A. G. Robinson, ed., Problems of Economic Development, London: Macmillan.

Houthakker, Henrik S. (1976). "Disproportional Growth and the Intersectoral Distribution of Income", in J. S. Cramer, A. Heertje and P. Venekamp, eds., Relevance and Precision: Essays in Honor of Pieter de Wolff, Amsterdam: North-Holland.

Hughes, J. R. T. (1959). "Foreign Trade and Balanced Growth: The Historical Framework", American Economic Review, Papers and Proceedings, May, 330-337.

- Hunt, E. K. (1979). "The categories of productive and unproductive labor in Marxist economic theory", Science and Society, 43(3), Fall 303-325.
- Jha, Raghbendra and Ulrich Lacher (1981). "Optimum Taxation and public production in a dynamic Harris-Todaro world", Journal of Development Economics, 9, 357-373.
- Johansen, Leif (1960a). A Multi-Sectoral Study of Economic Growth, Amsterdam: North-Holland.
- Johansen, Leif (1960b). "Rules of thumb for the expansion of industries in a process of economic growth", Econometrica, 28 (2).
- Johnston, Bruce F. and John W. Mellor (1961). "The Role of Agriculture in Economic Development", American Economic Review, June.
- Johnston, J. (1975). "A Macro-Model of Inflation", Economic Journal, 85, June.
- Jorgenson, Dale W. (1961). "The Development of a Dual Economy", Economic Journal, 71, 309-334.
- Jorgenson, Dale W. (1966). "Testing Alternative Theories of the Development of a Dual Economy", in I. Adelman and E. Thorbecke, eds., The Theory and Design of Economic Development, Baltimore: Johns Hopkins University Press.
- Jorgenson, Dale W. (1967). "Surplus Agricultural Labour and the Development of a Dual Economy", Oxford Economic Papers, 19, 288-312.
- Kaldor, Nicholas (1966). Causes of the Slow Rate of Growth of the United Kingdom, Cambridge: Cambridge University Press.
- Kaldor, Nicholas (1976). "Inflation and recession in the world economy", Economic Journal, 86, December, 703-714.
- Kaldor, Nicholas (1979). "Equilibrium Theory and Growth Theory", in M. J. Boskin, ed., Economics and Human Welfare, New York: Academic Press.
- Kaldor, Nicholas (1985). Economics Without Equilibrium. New York: M. E. Sharpe.
- Kalecki, Michal (1971). Selected Essays on the Dynamics of the Capitalist Economy, Cambridge: Cambridge University Press.
- Kalecki, Michal (1972). Selected Essays on the Economic Growth of the Socialist and the Mixed Economy. Cambridge: Cambridge University Press.
- Kalecki, Michal (1976). Essays on Developing Economies, Harvester Press.
- Kanbur, S. M. and J. McIntosh (1988). "Dual economy models: Retrospect and Prospect", Bulletin of Economic Research, 40(2), 83-113.
- Kelley, Allen C., Jeffrey G. Williamson and Russel J. Cheetham (1972), Dualistic Economic Development. Theory and History, Chicago: Chicago University Press.

- Khan, M. Ali (1980). "The Harris-Todaro hypothesis and the Heckscher-Ohlin-Samuelson trade model: a synthesis", Journal of International Economics, 10, 527-547.
- Khan, M. Ali (1987). "Harris-Todaro model", in J. Eatwell, M. Milgate and P. Newman, eds., The New Palgrave, London: Macmillan.
- Kindleberger, Charles P. (1957). Economic Development, 2nd edition, 1965, New York: McGraw Hill.
- Komiya, R. (1959). "A Note on Professor Mahalonibs' Model of Indian Economic Planning", February, Review of Economics and Statistics, 41, 29-35.
- Krugman, Paul (1981). "Trade, accumulation and uneven development", Journal of Development Economics.
- Kuznets, Paul W., (1988). "An East Asian Model of Economic Development: Japan, Taiwan, and South Korea", Economic Development and Cultural Change, 36(3) Suppl., April.
- Kuznets, Simon S. (1955). "Economic Growth and Income Inequality", American Economic Review, 45, 1-28.
- Kuznets, Simon S. (1961). "Economic Growth and the Contribution of Agriculture: Notes on Measurement", International Journal of Agrarian Affairs, 3, 59-75.
- Kuznets, Simon S. (1966). Modern Economic Growth, New Haven, Connecticut: Yale University Press.
- Kuznets, Simon S. (1971). Economic Growth of Nations, Cambridge: Harvard University Press.
- Landau, David (1983). "Government Expenditure and Economic Growth: A Cross-Country Study", Southern Economic Journal, 38.
- Leeson, P. E. (1979). "The Lewis Model and Development Theory", The Manchester School, September, 196-210.
- Lele, Uma and John W. Mellor (1981). "Technological Change, Distributive Bias and Labour Transfer in a Two Sector Economy", Oxford Economic Papers, November, 426-441.
- Leontief, Wassily W. (1941). The Structure of the American Economy 1919-29, Cambridge: Harvard University Press, 2nd ed., 1951, New York: Oxford University Press.
- Leontief, Wassily W., et. al. (1953). Studies in the Structure of the American Economy, New York: Oxford University Press.
- Lewis, W. Arthur (1954). "Economic Development with Unlimited Supplies of Labour", Manchester School of Economics and Social Studies, 22, 139-191.

- Lewis, W. Arthur (1955). The Theory of Economic Growth, London: George Allen and Unwin.
- Lewis, W. Arthur (1958). "Unlimited Labour: Further Notes", Manchester School of Economics and Social Studies, 26, 1-32.
- Lewis, W. Arthur (1972). "Reflections on Unlimited Labor", in L. E. di Marco, ed., International Economics and Development, New York: Academic Press.
- Lewis, W. Arthur (1979). "The Dual Economy Revisited", The Manchester School, September.
- Lipton, Michael (1977). Why Poor People Stay Poor: Urban Bias in World Development, Cambridge: Harvard University Press.
- Lipton, Michael (1980). "Migration from Rural Areas of Poor Countries: The Impact on Rural Productivity and Income Distribution", World Development, 8, 1-24.
- List, Friedrich (1841). The National System of Political Economy (orig., German; Eng. tr., New York: Longmans, Green and Co., 1904.
- Little, Ian M. D. (1982). Economic Development, New York: Basic Books.
- Lustig, Nora (1980). "Underconsumption in Latin American Economic Thought: Some Considerations", Review of Radical Political Economics, 12(1), Spring, 35-43.
- Lustig, Nora (1982). "Characteristics of Mexican Economic Growth", Journal of Development Economics, 10, 355-376.
- Luxemburg, Rosa (1913). The Accumulation of Capital, New York: Monthly Review Press, 1968.
- Lysy, Frank J. (1980). "Investment and Employment with Unlimited Labour. The Role of Aggregate Demand", Journal of Development Economics, 7, 541-566.
- McCarthy, F. Desmond, Lance Taylor and Cyrus Talati (1987). "Trade Patterns in Developing Countries, 1964-82", Journal of Development Economics, 27 (1-2), October, 5-39.
- McIntosh, James (1975). "Growth and Dualism in Less Developed Countries", Review of Economic Studies, 421-433.
- McKinnon, Ronald I. (1964). "Foreign Exchange Constraints in Economic Development and Efficient Aid Allocation", Economic Journal, 74, June, 388-409.
- Mahalanobis, P. C. (1953). "Some Observations of the Process of Growth of National Income, Sankhya, 12, 307-312.
- Mahalanobis, P. C. (1955). "The Approach of Operational Research to Planning in India", Sankhya, 16, 3-130.

- Mainwaring, Lyn (1984). Value and distribution in capitalist economies. An introduction to Sraffian economics, Cambridge: Cambridge University Press.
- Manne, Alan S. (1974). "Multisector Models for Development Planning: A Survey", in M. D. Intrilligator and D. A. Kendrick, eds., Frontiers of Quantitative Economics, Amsterdam: North Holland.
- Marglin, Stephen A. (1966). "Comment on Jorgenson", in I. Adelman and E. Thorbecke, eds., The Theory and Design of Economic Development, Baltimore: Johns Hopkins University Press.
- Marglin, Stephen A. (1976). Value and Price in the Labour Surplus Economy, Oxford: Oxford University Press.
- Marglin, Stephen A. (1984). Growth, distribution and prices, Harvard: Harvard University Press.
- Marino, Anthony M. (1975). "On the Neoclassical version of the Dual Economy", Review of Economic Studies, 435-443.
- Marx, Karl (1867). Capital, Vol 1, New York: International Publishers, 1967.
- Marx, Karl (1894). Capital, Vol 3, New York: International Publishers, 1967.
- Mathur, Ashok (1966). "Balanced v. unbalanced growth - A reconciliatory view", Oxford Economic Papers, 18, 137-157.
- Mazumdar, Dipak (1976). "The rural-urban wage gap, migration and the shadow wage", Oxford Economic Papers, 28.
- Mellor, John (1974). "Models of Economic Growth and Land-Augmenting Technological Change in Foodgrain Production", in N. Islam, ed., Agricultural Policy in Developing Countries, London: Macmillan.
- Mitra, Ashok (1977). The Terms of Trade and Class Relations, London: Frank Cass.
- Montias, J. M. (1961). "Balanced growth and international specialization: a diagrammatic analysis", Oxford Economic Papers, June.
- Mukherji, Badal (1982). Theory of Growth and the Tradition of Ricardian Dynamics, Delhi: Oxford University Press.
- Mundle, Sudipto (1985). "The Agrarian Barrier to Industrial Growth", Journal of Development Studies, 22(1), October, 49-80.
- Myint, Hla (1958). "The 'classical theory' of international trade and underdeveloped countries", Economic Journal, 68, June, 317-337.
- Nath, S. K. (1962). "The Theory of Balanced Growth", Oxford Economic Papers, June.

- Nayyar, Deepak (1978). "Industrial development in India: Some reflections on growth and stagnation", Economic and Political Weekly, August.
- Neary, J. Peter (1981). "On the Harris-Todaro model with inter-sectoral capital mobility", Economica, 48, 219-34.
- Neary, J. Peter (1988). "Stability of the Mobile-capital Harris-Todaro Model: Some Further Results", Economica, 55, 123-127.
- Niho, Yoshio (1976). "The Role of Capital Accumulation in the Industrialization of a Labor Surplus Economy. A formulation of the Fei-Ranis Model", Journal of Development Economics, 3, 161-169.
- Nikaido, Hukukane (1985). "Dynamics of Growth and Capital Mobility in Marx's scheme of reproduction", Zeitschrift für Nationalökonomie, 45(3), 197-218.
- Nurkse, Ragnar (1952). "Some International Aspects of the Problem of Economic Development", American Economic Review, Papers and Proceedings, May.
- Nurkse, Ragnar (1953). Problems of Capital Formation in Underdeveloped Countries, Oxford: Basil Blackwell.
- Nurkse, Ragnar (1957). "Balanced and Unbalanced Growth", Istanbul Lectures, Lectures in Economic Development, reprinted in Nurkse (1962).
- Nurkse, Ragnar (1959a). Patterns of Trade and Development, Stockholm: Almqvist and Wicksell, reprinted in Nurkse (1962).
- Nurkse, Ragnar (1959b). "Notes on 'Unbalanced Growth'", Oxford Economic Papers, October, reprinted in Nurkse (1962).
- Nurkse, Ragnar (1962). Equilibrium and Growth in the World Economy, Cambridge: Harvard University Press.
- Ocampo, Jose Antonio and Leonardo Villar (1988), "Development Issues Relevant for Colombia", unpublished, World Institute of Development Economics Research, August.
- Ohlin, Goran (1959). "Balanced Economic Growth in History", American Economic Review, Papers and Proceedings, May, 338-353.
- Pasinetti, Luigi L. (1960). "A Mathematical Formulation of the Ricardian System", Review of Economic Studies, 27, 78-98.
- Pasinetti, Luigi L. (1977). Lectures on the Theory of Production, London: Macmillan.
- Pasinetti, Luigi L. (1981). Structural Change and Economic Growth, New York: Cambridge University Press.
- Perkins, Dwight H. and Moshe Syrquin (1988). "The Development of Large Countries: The Influence of Size", in Chenery and Srinivasan (1988).

- Perrings, Charles (1986). "Income Distribution and Labour Surplus in the Classical Theory of Labour Migration", The Manchester School.
- Perrings, Charles (1987). "Industrial Wages, Rural Income and Unemployment in the Open Agrarian Economy", unpublished, University of Auckland.
- Preobrazhensky, Evgeny (1965). The New Economics, London: Oxford University Press.
- Quesnay, Francois (1758). Tableau Economique, Eng. tr., London: Macmillan, 1972.
- Raj, K. N. (1976). "Growth and stagnation of Indian industries", Economic and Political Weekly, Annual Number.
- Raj, K. N. and Amartya Sen (1961). "Alternative patterns of growth under conditions of stagnant export earnings", Oxford Economic Papers, 13(1).
- Rakshit, Mihir (1982). The Labour Surplus Economy, Delhi: Macmillan.
- Ranis, Gustav (1984). "Typology in Development Theory: Retrospective and Prospects", in Syrquin, Taylor and Westphal (1984).
- Ranis, Gustav and John Fei (1961). "A Theory of Economic Development", American Economic Review, 51.
- Rao, J. Mohan (1987a). "Distribution and Growth with an Infrastructure Constraint", unpublished, Boston University.
- Rao, J. Mohan (1987b). "Agrarian Structure, Labor Supplies and the Terms of Trade", unpublished, Boston University.
- Rattso, Jorn (1986a). "A Note on Social Articulation", Journal of Development Economics, 21, May, 347-352.
- Rattso, Jorn (1986b). "A Macrodynamic Model of a Dual Semi-Industrialized Economy", unpublished, Institute of Economics, University of Trondheim.
- Ricardo, David (1817). Principles of Political Economy and Taxation, ed., P. Sraffa, Cambridge: Cambridge University Press, 1951.
- Robertson, Paul and Stanislaw Wellisz (1977). "Stead-state growth of an economy with intersectoral migration", Oxford Economic Papers, November, 370-388.
- Robinson, Joan (1956). The Accumulation of Capital, London: Macmillan.
- Rosenstein-Rodan, Paul N. (1943). "Problems of Industrialization in Eastern and South-Eastern Europe", Economic Journal, 53, 202-211.
- Rosenstein-Rodan, Paul N. (1961). "Notes on the Theory of the Big Push", in H. S. Ellis and H. C. Wallich, eds., Economic Development in Latin America, New York, St. Martin's Press.

- Rostow, W. W. (1960). The Stages of Economic Growth. A Non-Communist Manifesto, Cambridge: Cambridge University Press.
- Rothschild, Emma (1986). "A Divergence Hypothesis", Journal of Development Economics, 23(2), October, 2-5-226.
- Fowthorn, Bob (1975). "What Remains of Kaldor's Law?" Economic Journal, March.
- Fowthorn, Bob and John R. Wells (1987). Deindustrialization and Foreign Trade, (Cambridge: Cambridge University Press.
- Rybczynski, T. M. (1955). "Factor Endowments and Relative Commodity Prices", Economica, 22, 336-341.
- Sah, Raaj Kumar, and Joseph Stiglitz (1984). "The Economics of Price Scissors", American Economic Review, 74, 125-138.
- Sah, Raaj Kumar, and Joseph Stiglitz (1987). "Price Scissors and the Structure of the Economy", Quarterly Journal of Economics, February, 102(1), 109-134.
- Salter, W. E. G. (1959). "Internal and External Balance: The Role of Price and Expenditure Effects", Economic Record, 35, August, 226-238.
- Sarkar, Abhirup (1988). "Supply constraints, government subsidies and industrial employment", Journal of Development Economics, 28(1), 111-119.
- Sato, Ryuzo and Niho, Yoshio (1971). "Population growth and the development of a dual economy", Oxford Economic Papers, 23, 418-436.
- Schmookler, J. (1966). Invention and Growth, Harvard University Press.
- Schultz, Theodore W. (1964). Transforming Traditional Agriculture, New Haven: Yale University Press.
- Schwartz, J. T. (1961). Lectures on the mathematical method in analytical economics, New York: Gordon and Breach.
- Scitovsky, Tibor (1954). "Two Concepts of external economies", Journal of Political Economy, 17, April.
- Scitovsky, Tibor (1959). "Growth - Balanced or Unbalanced?" in M. Abramovitz, et. al., eds., The Allocation of Economic Resources, Stanford: Stanford University Press.
- Shashua, L. and Goldschmidt, Y. (1972). "The Merits of Balanced Growth Reconsidered", Review of Economics and Statistics, 54, August, 337-339.
- Schumpeter, Joseph (1934). The Theory of Economic Development, London: Oxford University Press.

- Sheahan, John (1958). "International Specialization and the Concept of Balanced Growth", Quarterly Journal of Economics, 63, May, 183-197.
- Sheahan, John (1959). "Reply", Quarterly Journal of Economics, 63, May, 346-7.
- Simon, Herbert (1947). "Effects of Increased Productivity upon the Ratio of Urban to Rural Population", Econometrica, 15, 31-42.
- Singer, Hans W. (1950). "The Distribution of the Gains between Investing and Borrowing Countries", American Economic Review, Papers and Proceedings, May.
- Singer, Hans W. (1958). "Balanced Growth in Economic Development: Theory and Practice", Malayan Economic Review, 3(2), October, reprinted in Singer (1964).
- Singer, Hans. W. (1964). International Development: Growth and Change, New York: McGraw Will.
- Singh, Ajit (1987). "Manufacturing and de-industrialization", in J. Eatwell, M. Milgate and P. Newman, eds., The New Palgrave, London: Macmillan.
- Smith, Adam (1776). An Inquiry into the Nature and Causes of the Wealth of Nations, 2 vols., New York and London: Oxford University Press, 1978.
- Solow, Robert M. (1956). "A Contribution to the Theory of Economic Growth", Quarterly Journal of Economics, 70, 65-94.
- Solow, Robert M. (1961). "A Note on Uzawa's Two-Sector Growth Model", Review of Economic Studies, 29.
- Sraffa, Piero (1960). Production of Commodities by Means of Commodities, Cambridge: Cambridge University Press.
- Stern, Nicholas H. (1971). "Optimum Development in a Dual Economy", Review of Economic Studies, 171-184.
- Standaert, Stan (1986). "Social articulation as a condition for equitable growth: a comment", Journal of Development Economics, 23, September, 153-159.
- Stern, Nicholas H. (1971). "Optimal Development in a Dual Economy", Review of Economic Studies, 171-184.
- Stiglitz, Joseph E. (1974). "Alternative Theories of wage determination and unemployment in LDCs: The Labour turnover model", Quarterly Journal of Economics, 88.
- Stiglitz, Joseph E. (1976). "The efficiency wage hypothesis, surplus labour and the distribution of labour in LDCs", Oxford Economic Papers, 28.
- Stiglitz, Joseph E. (1982). "Alternative Theories of Wage Determination and Unemployment: the Efficiency Wage Model", in M. Gersovitz, et. al., eds, The Theory and Experience of Economic Development, London: George Allen and Unwin.

- Stolper, Wolfgang and Paul Samuelson (1941). "Protection and Real Wages", Review of Economic Studies, 9, 58-73.
- Streeten, Paul (1959). "Unbalanced Growth", Oxford Economic Papers, 11, 167-90.
- Streeten, Paul (1961). Economic Integration, Leiden: Sythoff.
- Streeten, Paul (1963). "Balanced versus Unbalanced Growth", Economic Weekly, April 20, 1963, 669-71.
- Streeten, Paul (1964). "Unbalanced Growth, Programmes and Prognoses and the Ideal Plan", Banca Nazionale del Lavoro Quarterly Review, 69, June.
- Swamy, Dalip S. (1967). "Statistical Evidence of Balanced and Unbalanced Growth", Review of Economics and Statistics, 49, August, 288-303.
- Swan, Trevor W. (1960). "Economic Control in a Dependent Economy", Economic Record, 36, 51-66.
- Syrquin, Moshe (1986). "Productivity Growth and Factor Reallocation", in Chenery, Robinson and Syrquin (1986).
- Syrquin, Moshe (1987). "Crecimiento Economico y Cambio Estructural en Colombia: Una Comparacion Internacional", Coyuntura Economica, Bogota, federsarrollo, XVII(4), December.
- Syrquin, Moshe (1988). "Patterns of Structural Change", forthcoming in Chenery and Srinivasan (1988).
- Syrquin, Moshe and Hollis B. Chenery (1986). "Patterns of Development: 1950-1983", unpublished, World Bank.
- Syrquin, Moshe, Lance Taylor and Larry Westphal, ed. (1984). Economic Structure and Performance, Orlando: Academic Press.
- Targetti, Ferdinando (1985). "Growth and the Terms of Trade: A Kaldorian Two Sector Model", Metroeconomica, February, 79-96.
- Taylor, Lance (1971). "Investment Timing in Two-Gap Models", in H. B. Chenery, ed., Studies in Development Planning, Cambridge, Mass.: Harvard University Press.
- Taylor, Lance (1975). "Theoretical Foundations and Technical Implications", in C. Blitzer, P. B. Clark and L. Taylor, eds., Economy-Wide Models and Development Planning, Oxford: Oxford University Press.
- Taylor, Lance (1979). Macro Models for Developing Countries, New York: McGraw Hill.
- Taylor, Lance (1981). "South-North trade and Southern growth: Bleak prospects from a structuralist point of view", Journal of International Economics, 11, 589-602.

- Taylor, Lance (1983). Structuralist Macroeconomics, New York: Basic Books.
- Taylor, Lance (1985). "Demand Composition, Income Distribution and Growth", unpublished, Department of Economics, Massachusetts Institute of Technology.
- Taylor, Lance (1986). "Theories of Sectoral Balance", unpublished, Massachusetts Institute of Technology, December.
- Taylor, Lance (1987). "Varieties of Stabilization Experience" (1987 Marshall Lectures, Cambridge University) unpublished, Massachusetts Institute of Technology, April.
- Taylor, Lance and Edmar L. Bacha (1976). "The Unequalizing Spiral: A First Growth Model for Belindia", Quarterly Journal of Economics, 90, 197-218.
- Taylor, Lance, Hiren Sarkar and Jorn Rattso (1984). "Macroeconomic Adjustment in a Computable General Equilibrium Model for India", in M. Syrquin, L. Taylor and L. Westphal, eds., Economic Structure and Performance, New York: Academic Press.
- Thirlwall, A. P. (1986). "A General Model of Growth and Development on Kaldorian Lines", Oxford Economic Papers, 38, 199-219.
- Timmer, C. Peter (1988). "The Agricultural Transformation", in H. Chenery and T. N. Srinivasan, eds., Handbook of Development Economics, forthcoming, Amsterdam: North-Holland.
- Todaro, Michael P. (1969). "A Model of Labour Migration and Urban Unemployment in Less Developed Countries", American Economic Review, 59, March, 138-148.
- Uzawa, Hirofumi (1961). "On a Two Sector Model of Economic Growth", Review of Economic Studies, 29, October, 40-7.
- Uzawa, Hirofumi (1963). "On a Two Sector Model of Economic Growth, II", Review of Economic Studies, 30, June, 105-18.
- Vines, David (1984). "A North-South growth model along Kaldorian lines", Discussion Paper series, No. 26, Centre for Economic and Policy Research, Cambridge.
- von Neumann, John (1945). "A Model of General Equilibrium", Review of Economic Studies, 1-9.
- Watkins, Melville H. (1963). "A Staple Theory of Economic Growth", Canadian Journal of Economics and Political Science, 29, May, 141-58.
- Weitzman, Martin (1971). "Shiftable versus Non-shiftable capital: a synthesis", Econometrica, 39(3), 511-529, May.
- Weitzman, Martin (1982). "Increasing returns and the foundations of unemployment theory", Economic Journal, December.

Wellisz, Stanislaw (1968). "Dual Economies, Disguised Unemployment and the Unlimited Supply of Labour", Economica, 21-51.

Wells, John (1977). "The diffusion of durables in Brazil and its implications for recent controversies concerning Brazilian development", Cambridge Journal of Economics, 1, 259-279.

Wolff, Edward N. (1987). Growth, accumulation, and unproductive activity, Cambridge: Cambridge University Press.

Yotopoulos, Pan A. and L. J. Lau (1970). "Test for Balanced and Unbalanced Growth", Review of Economics and Statistics, 52(4), November, 376-384.

Yotopoulos, Pan A. and L. J. Lau (1975). "The Balanced-Unbalanced Growth Controversy Revisited", Review of Economics and Statistics, 57(4), November, 516-517.

Yotopoulos, Pan A. and Jeffrey B. Nugent (1976). Economics of Development. Empirical Investigations, New York: Harper & Row.

Young, Allyn (1928). "Increasing Returns and Economic Progress", Economic Journal, December, 527-542.

Zarembka, Paul (1970a). "Labor migration and urban unemployment: comment", American Economic Review, 184-186.

Zarembka, Paul (1970b). "Marketable Surplus and Growth in the Dual Economy", Journal of Economic Theory, 2, 107-121.

WIDER WORKING PAPERS

- WP 1. Amartya Sen: Food, economics and entitlements, February 1986
- WP 2. Nanak Kakwani: Decomposition of normalization axiom in the measurement of poverty: a comment, March 1986
- WP 3. Pertti Haaparanta: The intertemporal effects of international transfers, April 1986
- WP 4. Nanak Kakwani: Income inequality, welfare and poverty in a developing economy with applications to Sri Lanka, April 1986
- WP 5. Pertti Haaparanta: and Juha Kähkönen: Liberalization of Capital Movements and Trade: Real Appreciation, Employment and Welfare, August 1986
- WP 6. Pertti Haaparanta: Dual Exchange Markets and Intervention, August 1986
- WP 7. Pertti Haaparanta: Real and Relative Wage Rigidities – Wage Indexation* in the Open Economy Staggered Contracts Model, August 1986
- WP 8. Nanak Kakwani: On Measuring Undernutrition, December 1986
- WP 9. Nanak Kakwani: Is Sex Bias Significant? December 1986
- WP 10. Partha Dasgupta and Debraj Ray: Adapting to Undernourishment: The Clinical Evidence and Its Implications, April 1987
- WP 11. Bernard Wood: Middle Powers in the International System: A Preliminary Assessment of Potential, June 1987
- WP 12. Stephany Griffith-Jones: The International Debt Problem – Prospects and Solutions, June 1987
- WP 13. Don Patinkin: Walras' Law, June 1987
- WP 14. Kaushik Basu: Technological Stagnation, Tenurial Laws and Adverse Selection, June 1987
- WP 15. Peter Svedberg: Undernutrition in Sub-Saharan Africa: A Critical Assessment of the Evidence, June 1987
- WP 16. S. R. Osmani: Controversies in Nutrition and their Implications for the Economics of Food, July 1987
- WP 17. Frédérique Apffel Marglin: Smallpox in Two Systems of Knowledge, Revised, July 1987
- WP 18. Amartya Sen: Gender and Cooperative Conflicts, July 1987
- WP 19. Amartya Sen: Africa and India: What do we have to learn from each other? August 1987
- WP 20. Kaushik Basu: A Theory of Association: Social Status, Prices and Markets, August 1987
- WP 21. Kaushik Basu: A Theory of Surplus Labour, August 1987
- WP 22. Albert Fishlow: Some Reflections on Comparative Latin American Economic Performance and Policy, August 1987
- WP 23. Sukhamoy Chakravarty: Post-Keynesian Theorists and the Theory of Economic Development, August 1987
- WP 24. Georgy Skorov: Economic Reform in the USSR, August 1987
- WP 25. Amartya Sen: Freedom of Choice: Concept and Content, August 1987

- WP 26. Gopalakrishna Kumar: Ethiopian Famines 1973–1985: A Case-Study, November 1987
- WP 27. Carl Riskin: Feeding China: The Experience since 1949, November 1987
- WP 28. Martin Ravallion: Market Responses to Anti-Hunger Policies: Effects on Wages, Prices and Employment, November 1987
- WP 29. S. R. Osmani: The Food Problems of Bangladesh, November 1987
- WP 30. Martha Nussbaum and Amartya Sen: Internal Criticism and Indian Rationalist Traditions, December 1987
- WP 31. Martha Nussbaum: Nature, Function and Capability: Aristotle on Political Distribution, December 1987
- WP 32. Martha Nussbaum: Non-Relative Virtues: An Aristotelian Approach, December 1987
- WP 33. Tariq Banuri: Modernization and its Discontents A Perspective from the Sociology of Knowledge, December 1987
- WP 34. Alfred Maizels: Commodity Instability and Developing Countries: The Debate, January 1988
- WP 35. Jukka Pekkari: Keynesianism and the Scandinavian Models of Economic Policy, February 1988
- WP 36. Masahiko Aoki: A New Paradigm of Work Organization: The Japanese Experience, February 1988
- WP 37. Dragoslav Avramovic: Conditionality: Facts, Theory and Policy – Contribution to the Reconstruction of the International Financial System, February 1988
- WP 38. Gerald Epstein and Juliet Schor: Macropolicy in the Rise and Fall of the Golden Age, February 1988
- WP 39. Stephen Marglin and Amit Bhaduri: Profit Squeeze and Keynesian Theory, April 1988
- WP 40. Bob Rowthorn and Andrew Glyn: The Diversity of Unemployment Experience Since 1973, April 1988
- WP 41. Lance Taylor: Economic Openness – Problems to the Century's End, April 1988
- WP 42. Alan Hughes and Ajit Singh: The World Economic Slowdown and the Asian and Latin American Economies: A Comparative Analysis of Economic Structure, Policy and Performance, April 1988
- WP 43. Andrew Glyn, Alan Hughes, Alan Lipietz and Ajit Singh: The Rise and Fall of the Golden Age, April 1988
- WP 44. Jean-Philippe Platteau: The Food Crisis in Africa: A Comparative Structural Analysis, April 1988
- WP 45. Jean Drèze: Famine Prevention in India, May 1988
- WP 46. Peter Svedberg: A Model of Nutrition, Health and Economic Productivity, September 1988
- WP 47. Peter Svedberg: Undernutrition in Sub-Saharan Africa: Is There a Sex-Bias?, September 1988
- WP 48. S. R. Osmani: Wage Determination in Rural Labour Markets: The Theory of Implicit Co-operation, December 1988
- WP 49. S. R. Osmani: Social Security in South Asia, December 1988
- WP 50. S. R. Osmani: Food and the History of India – An 'Entitlement' Approach, December 1988
- WP 51. Grzegorz W. Kolodko: Reform, Stabilization Policies, and Economic Adjustment in Poland, January 1989
- WP 52. Dariusz Rosati and Kalman Mizsei: Adjustment through Opening of Socialist Economies, January 1989
- WP 53. Andrei Vernikov: Reforming Process and Consolidation in the Soviet Economy, January 1989
- WP 54. Adam Török: Stabilisation and Reform in the Hungarian Economy of the late 1980s, March 1989
- WP 55. Zhang Yuyan: Economic System Reform in China, March 1989
- WP 56. Amitava Krishna Dutt: Sectoral Balance: A Survey, March 1989