

Some Problems in the Analysis of the Dual Economy

by

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INTRODUCTION

There is a good deal of confusion in the literature on the dual economy stemming from *i*) the frequent failure to specify assumptions made about the level and characteristics of unemployment and underemployment, and *ii*) the difficulties of building institutional rigidities into neoclassical allocation-models without producing results which are indeterminate or lacking in generality. This paper sets out some of the major assumptions made in various discussions of the dual economy, examines the effects of these assumptions on production and factor-use decisions in each sector and on the product-transformation locus for the economy, and suggests some related problems of policy analysis in the dual economy. The aim is to develop an analytical framework that approximates economic conditions in underdeveloped countries by examining some of the niceties of the traditional analysis in light of certain institutional rigidities that seem to exist in most underdeveloped countries.

II. DIFFERENCES AMONG TWO-SECTOR MODELS

The major characteristics of the dual-economy models are well-known. There are two sectors—"modern" or "capitalistic" and "traditional" or "subsistence". Although these sectors need not be identified exclusively with the urban-manufacturing-industrial sector on the one hand and the rural-agricultural sector on the other hand, most discussions of the dual economy do simplify the model in this way¹. Such a simplification will be made here. Assumptions regarding factors of production vary. Some economists prefer to keep capital as a factor completely out of the traditional sector's production function, so that land and labour are factors for the traditional sector, whereas capital and

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¹ In his two articles on the dual economy, W.A. Lewis is careful to point out that there may be subsistence "industrial" undertakings as well as capitalist agriculture. See, W.A. Lewis, "Economic Development with Unlimited Supplies of Labour", *Manchester School*, Vol. XXII, May 1954, pp. 139-191, and "Unlimited Labour: Further Notes", *Manchester School*, Vol. XXVI, January 1958, pp. 1-32. Another discussion of the modern-traditional split within manufacturing is found in G. Ranis, "Production Functions, Market Imperfections and Economic Development", *Economic Journal*, Vol. LXXII, June 1962, pp. 344-354.

labour are factors for the modern industrial sector. Since capital does play some role even in subsistence agriculture, and since problems of segmented capital-markets are important in underdeveloped countries, capital and labour are assumed to be the factors of production for both sectors in this discussion².

Four basic cases of the two-sector, two-product, two-factor model must be analysed. First is the usual neoclassical economy with full factor-price flexibility and full employment of all factors. Second is the case of a single disequilibrium factor-price ratio common to both sectors. (Here the actual factor-price ratio differs from the ratio of social opportunity-costs, or shadow prices). Third is a case of different factor-price ratios in the two sectors and unemployed labour in urban areas. Finally, the fourth case examined is that of different factor-price ratios in the two sectors but full employment (*i.e.*, no overt unemployment) of factors. The four cases can be classified according to two characteristics: *i*) single or multiple prices of the same factor of production, and *ii*) the level of overt unemployment. In cases one and two the ratio of factor prices is always the same in both sectors, while in cases three and four the ratio of factor prices is different in the two sectors. Factors of production are fully employed in cases one and four, but there is unemployed labour in cases two and three.

The analysis of a well-behaved neoclassical two-sector economy is well-known, and the generation of a production-possibilities curve or transformation locus presents no problem³. In Figure I, the production functions of the two sectors (modern = M and traditional = T) are placed in a trading box in the usual fashion. The locus of Pareto optima $O_T ABC O_M$ in the trading box gives the maximum production of each good, given any level of production of the other. This locus is reproduced as the outer product-transformation locus $P_O P_O'$ in Figure II. Since factor prices are flexible, the economy can produce at any point along $P_O P_O'$. An equilibrium point of production and consumption would result at R_O with level of indifference I_O in the closed economy. The community indifference curve (or social welfare function) is tangent to the production-possibilities curve and all is right with the world.

² The difference between the land-labour assumption and the capital-labour assumption for factors of production in the traditional sector is unimportant for part of the discussion that follows: that dealing with intersectoral wage-differentials. But for some other points to be mentioned, particularly those dealing with problems of the segmented capital-market, the use of capital rather than land as the "other" factor of production in agriculture facilitates discussion of some sticky points in the usual analysis. Thus, there appears to be a gain in generality in the model by the use of capital instead of land.

³ For a complete discussion of the neoclassical case, see, F.M. Bator, "The Simple Analytics of Welfare Maximization", *American Economic Review*, Vol. XLVII, March 1957, pp. 22-59. I have neglected the general case that Bator treats in which different factor prices call forth different supplies of the factors, thus changing the dimensions of the trading box. This omission does not alter the basic results of the analysis as developed here, and would serve only to further complicate the diagrammatics. As usual, I have assumed no increasing returns.

FIGURE I

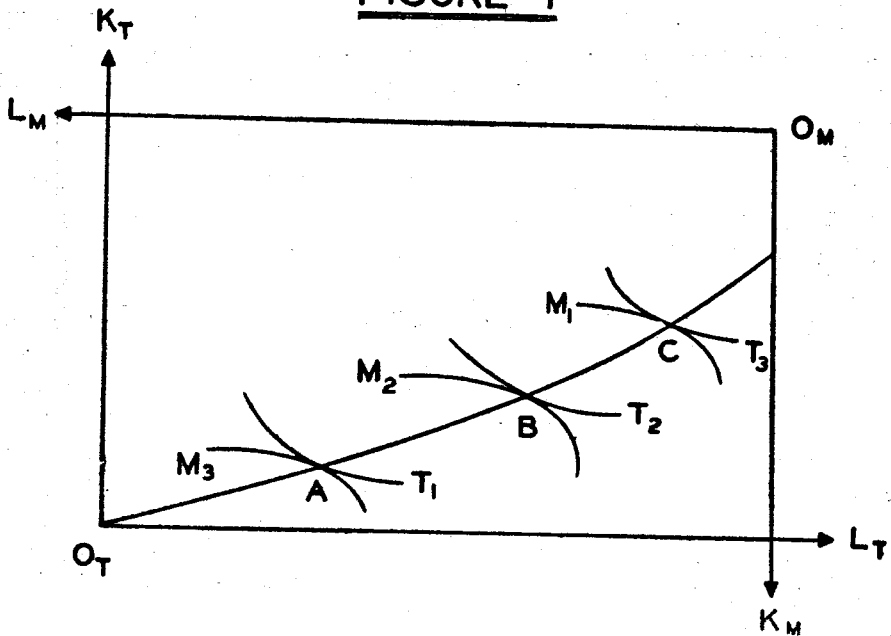
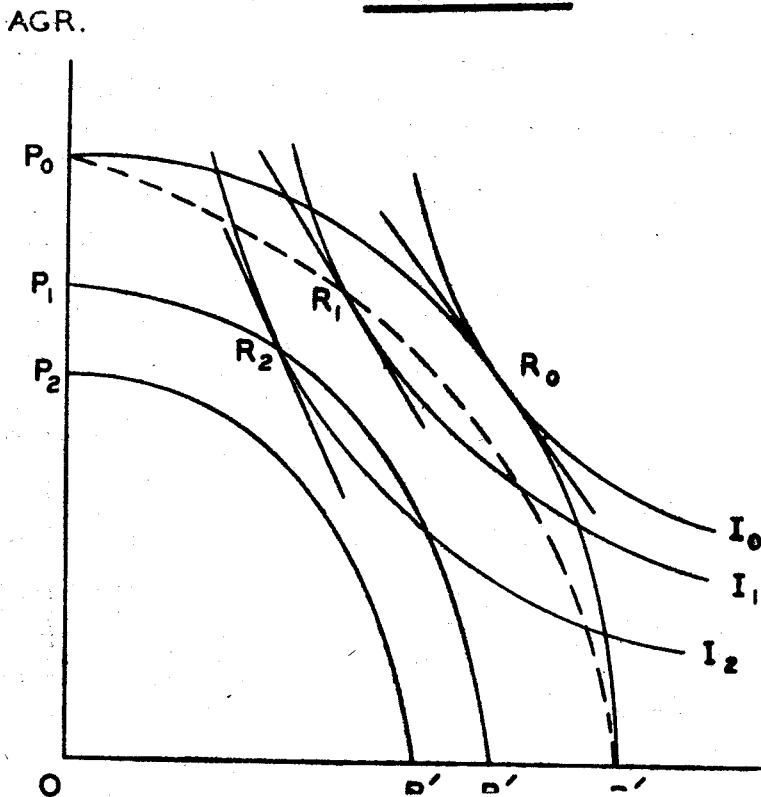


FIGURE II



Before proceeding, a word should be said about the use of the words equilibrium and disequilibrium in the rest of this paper. Equilibrium, when used without quotation marks will designate a point from which the system will not tend to move. When used in quotation marks, "equilibrium" will refer to a neoclassical "equilibrium" position, where all the usual marginal equivalences hold. The same usage applies to the word disequilibrium. Thus, a "disequilibrium" situation (with respect to neoclassical conditions) can be an equilibrium position (if, due to institutional forces, the system does not have a tendency to move to another position).

Now consider an economy characterized by the same factor prices in the two sectors, but where these factor prices are different from the shadow prices or social opportunity-costs⁴. Such a situation would generally take the form of wages that are "too high" and/or interest rates that are "too low", given factor availabilities. Labour would be unemployed due to scarcity of complimentary factors (capital) at existing wage and interest rates and product prices. The results of such a situation are shown in Figure III, which at first sight appears somewhat bizarre. The production functions and factor endowments are the same as in case one. However, the ratio of factor prices is *given* by the institutional framework of the economy regardless of output mix.

For any set of relative factor prices, one can generate a locus of factor-use points consistent with maximizing behaviour on the part of entrepreneurs in each sector. This is simply a locus of tangencies of the steep factor-price lines with the isoquants for each sector⁵. The factor-use locus for the traditional sector is $O_T A'' B'' C'' O_M$, and that for the modern sector is $O_T A' B' C' O_M$. Since by assumption capital is underpriced, capital will be "fully employed". Any horizontal line such as $K_1 K_1'$ divides the available capital between sectors; and for that level of capital and given factor prices, the intersection of $K_1 K_1'$ with the factor-use locus of each sector determines *i*) the level of output in that sector, and *ii*) the level of employment. It is easily seen that, with division of capital $K_1 K_1'$ and the given factor-price ratios, the traditional sector will employ $O_T L_2$ and the modern sector $O_M L_1'$ with $L_2 L_1'$ of labour unemployed.

⁴ This is best expressed in the case of post-War Europe by E. Despres and C. P. Kindleberger, "The Mechanism of Adjustment in International Payments. The Lessons of Post-War Experience", *American Economic Review*, Vol. XLII, May 1952, pp. 332-334. Despres and Kindleberger also mention this kind of disequilibrium in the context of underdeveloped countries (pp. 340-341). Several other articles on the dual economy make the distinction between *i*) intersectoral differentials, and *ii*) disequilibrium factor-prices common to both sectors. See, in particular, J. Bhagwati and V. K. Ramaswami, "Domestic Distortions, Tariffs and the Theory of Optimum Subsidy", *Journal of Political Economy*, Vol. LXXI, February 1963, pp. 44-50. This case, however, seems to have much less empirical content than the next two cases to be analysed.

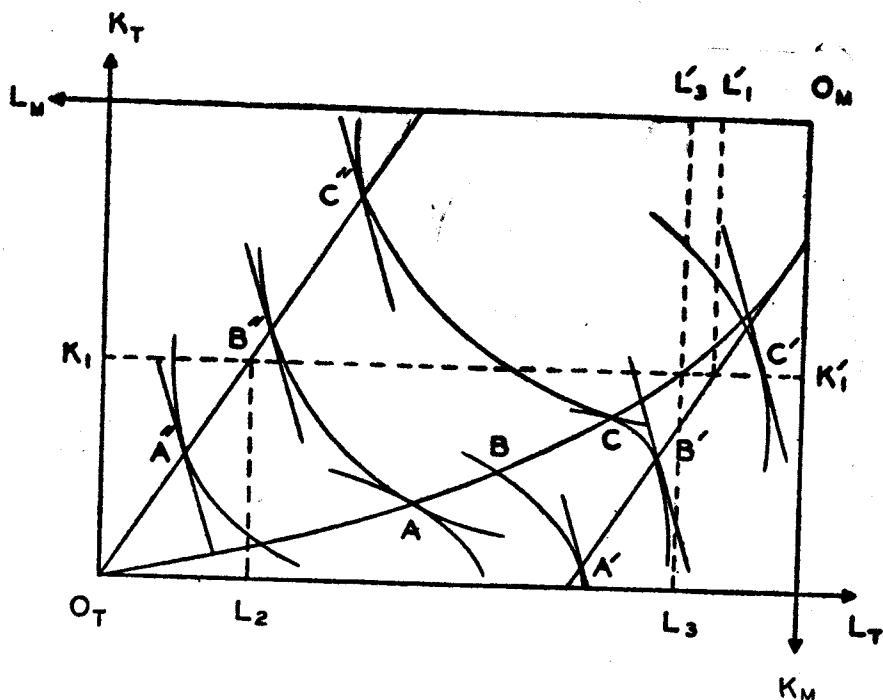
⁵ Since a linear production-function is assumed, the expansion path with a fixed factor-price ratio is a straight line. Homogeneity is not an assumption that seems warranted, however, especially in the light of discussion of minimum scale in the capitalist sector (see, R. S. Eckaus, "The Factor Proportions Problem in Underdeveloped Areas", *American Economic Review*, Vol. XLV, September 1955, pp. 539-565). Thus, there is positive intercept on the capital axis for the modern sector.

The third case considered is more relevant to the situation in many underdeveloped countries and is one of the two principal varieties of the dual economy which appear in the literature⁶. In this case there are intersectoral differentials

G. Ranis, *op. cit.*

The presence of unemployed labour in the above models makes certain important differences in their properties. Critics of policies based on these analytical models have often implicitly or explicitly assumed a fully employed economy, as is suggested below.

FIGURE III



in factor prices and in factor-price ratios. Wages in the modern sector are higher and interest rates are lower than in the traditional sector⁷. There is under-employment (excess labour) in agriculture reflected by lower than "optimum" marginal product of labour, and there is *overt* unemployment in nonagricultural areas. The reason for these characteristics is the "disequilibrium" factor-price ratios facing the two sectors. Institutional rigidities dictate higher wages and lower capital-prices in urban than in rural areas. This results in restricted use of labour in urban areas, even though the high wage-rates encourage migration to those areas. Since there are costs of migration, labour remains unemployed in cities hoping for work at high wages rather than returning to farms. An important characteristic of the model is that urban employment could be expanded without reducing employment in rural areas. Therefore, there is no need to assume that the marginal product of labour in agriculture is zero in order to get "unlimited supplies of labour" even in the comparative static case⁸.

The economy represented by case three is shown in Figure IV. The price lines facing the modern sector are more steep than the "equilibrium" factor-price ratios. This is reflected graphically by the fact that the locus of factor-use points for the modern sector $O_T A' B' C' O_M$ lies to the right of, and implies higher capital-labour ratios than, the neoclassical contract curve $O_T ABC O_M$. In addition, the factor-price lines facing the traditional sector are less steep than the "equilibrium" price-ratios along its factor-use locus $O_T A'' B'' C'' O_M$ implying a lower capital-labour ratio for that sector than along $O_T ABC O_M$. To remain consistent with more formal treatments of the dual economy, the factor-price differentials are assumed to be proportional at all points of production for the economy. If wage rates in the modern sector and traditional sector are w_M and w_T , and capital prices are r_M and r_T respectively, the condition of proportional differentials may be stated as:

$$\frac{w_T}{r_T} = k \frac{w_M}{r_M} \quad \text{or} \quad \frac{w_T}{r_T} \div \frac{w_M}{r_M} = k$$

⁷ On the subject of the wage differential, see both articles by W.A. Lewis, *op. cit.*, and also an excellent summary and critique of the reasons for wage differentials, given by Bhagwati and Ramaswami, *op. cit.*, p. 47.

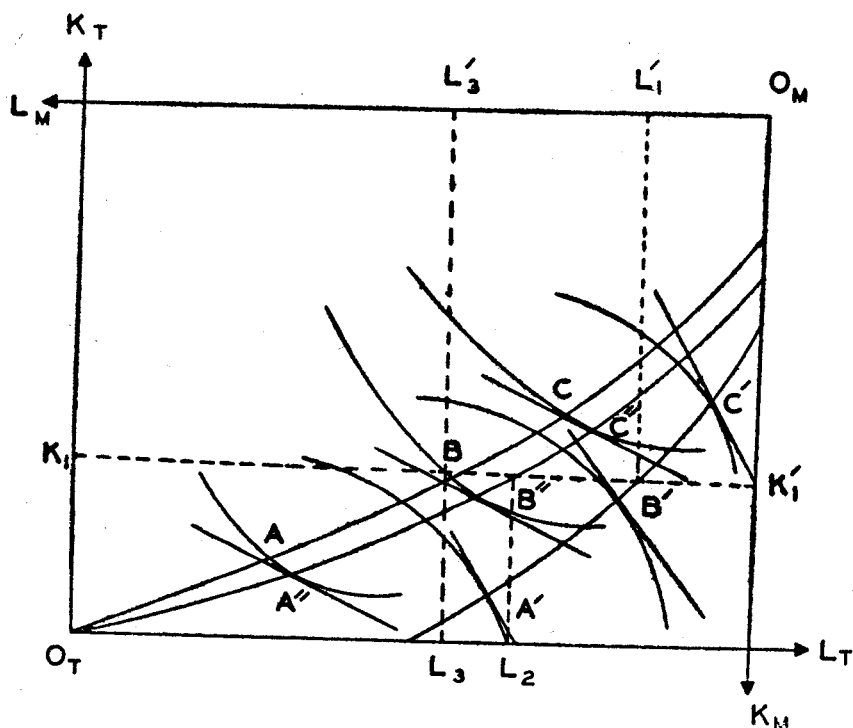
On the subject of interest-rate differentials and segmented capital-markets, see:

i) U Tun Wai, "Interest Rates in the Organized Money Markets of Underdeveloped Countries", *IMF Staff Papers*, Vol. V, August 1956, pp. 249-278;

ii) U Tun Wai, "Interest Rates Outside the Organized Money Markets of Underdeveloped Countries", *IMF Staff Papers*, Vol. VI, November 1957, pp. 80-142.

⁸ In the context of a growing economy with a growing population "unlimited labour" can be expressed as the ability of the urban population and labour force to grow at a faster rate than the rural population and labour force (through rural-urban migration) without a decrease in the growth of agricultural output. Such an interpretation may, in many countries, make more economic sense than the idea that, at any given time, some significant percentage of the labour force could be moved from farm to city without any effect on agricultural output.

FIGURE IV



where k is less than one⁹. The assumption of proportional differentials means that for any division $K_1 K_1'$ of capital, the scarce factor, the traditional sector's factor-price line (at that point) will intersect the modern sector's factor-price line at a constant angle. Thus, rather than equal factor prices in the two sectors, as in the neoclassical case, there is a constant (proportional) wedge driven between the factor-price ratios facing the two sectors by the institutional framework of the economy.

Under the constraints of *i*) equi-proportional factor-price differentials, *ii*) overt unemployment, and *iii*) marginal product of labour in the traditional sector less than "equilibrium" and in the modern sector greater than "equilibrium", the locus of factor-use points in the modern sector is $O_T A' B' C' O_M$ and in the traditional sector is $O_T A'' B'' C'' O_M$. Once again, for any given distribution of capital between sectors, one can specify the level of factor utili-

⁹ If $w_T = w_M$ and $r_T = r_M$, then $k = 1$. In cases one and two above, k does equal one. Thus, the approach to the problem of factor-price differentials presented here may be thought of as fairly general, with specific results being obtained by the use of specific assumptions about k , the factor-price differential.

zation and the level of output for each sector. If the levels of output are plotted for each sectoral division of capital, their locus would form P_1P_1' in Figure II. P_1P_1' lies outside P_2P_2' and lies inside P_0P_0' at all relevant levels of output. On an intuitive, partial-equilibrium basis one might say that along P_1P_1' there is less unemployment than along P_0P_0' , and P_1P_1' should, therefore, lie between the other two loci. Once again, it should be pointed out that expansionary fiscal-policy that does not alter relative factor prices will not move the economy past P_1P_1' and, thus will not absorb the unemployed labour.

In a case of "factor-level disequilibrium", there will also be a problem of "disequilibrium" in the structure of relative product prices. Such a "disequilibrium" is shown in Figure II as production at point R_2 where indifference surface I_2 is tangent to the relative price lines, but both "slice" the transformation locus P_1P_1' . Technically, this can be thought of as the failure of the rate of product transformation by producers to be equal to the rate of product substitution by consumers (which violates one of the conditions of welfare maximization). Hagen and others¹⁰ have shown why the distortion in relative factor prices leads to a distortion of relative product prices: the "wedge" between factor prices in the two sectors drives a "wedge" between the real rate and the money rate of transformation of factors from one sector to the other. Intuitively, this can be thought of as a result of higher prices for equivalent factors in the modern (manufacturing) sector than in the traditional (agricultural) sector¹¹, which leads to a difference between the marginal social cost and the marginal private cost of transforming a unit of agricultural output into manufacturing output. This is reflected in Figure II by the fact that at the equilibrium point R_2 the ratio of product prices (which represents the equilibrium marginal private rate of transformation) represents a higher relative price for manufactures than does the social rate of product transformation, as given by the slope of the transformation locus at that point. The relationship between factor-price distortions and product-price distortion is particularly important in the discussion of tariff and commercial policy and is referred to below in that context.

¹⁰ E.E. Hagen, "An Economic Justification of Protectionism", *Quarterly Journal of Economics*, Vol. LXXII, November 1958, pp. 496-514.

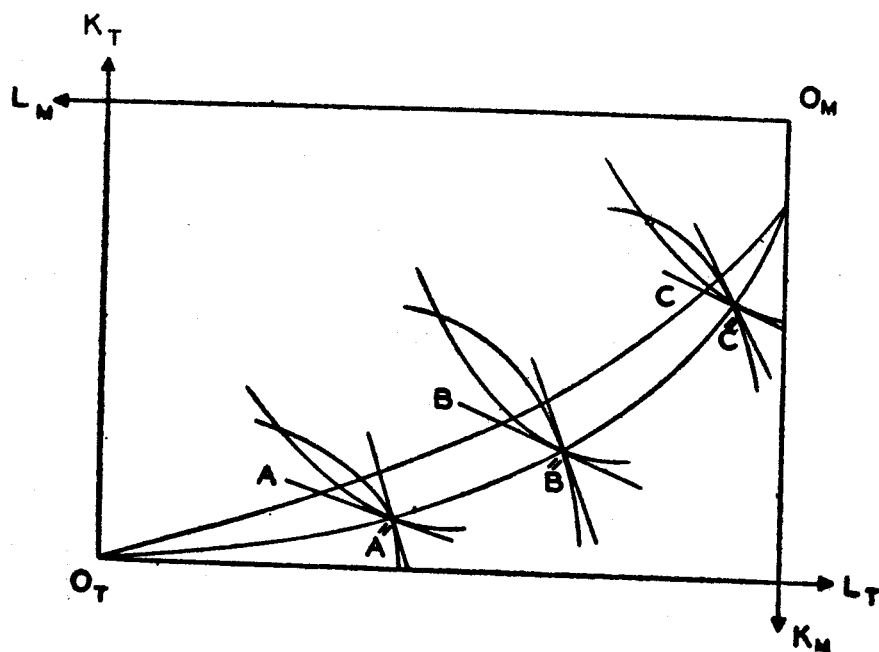
A. Fishlow and P.A. David, "Resource Allocation in an Imperfect Market Setting", *Journal of Political Economy*, Vol. LXIX, December 1961, pp. 529-546.

The latter article contains an excellent discussion of the relationship between "factor-level disequilibrium" and "product-price disequilibrium".

¹¹ While it is true that the rural sector must pay more for capital than the urban sector, the fact that labour is a large share of value added in either sector means that the marginal cost of an equivalent "bundle of factors" is usually higher in the modern than in the traditional sector. Usually, the problem of capital costs is neglected in the literature on the dual economy.

The last case considered is frequently assumed (implicitly or explicitly) by economists writing on tariff policy in the dual economy¹². The full-employment assumption, which is the key difference in case four, has also been made by those concerned with the problem of providing adequate agricultural surpluses for the expansion of the modern sector¹³. Emphasis on the need to increase agricultural productivity as a prerequisite for industrial expansion is, of course, more appropriate in the case of a fully employed economy than one in which there are substantial amounts of urban unemployment. Case four is shown in Figure V. Since full employment is assumed, production must take place at one point (common to both sectors) within the trading box. Factor-price differentials are proportional, so that the factor-price lines for the two sectors intersect at

FIGURE V



¹² See, R.E. Baldwin "Exchange Rate Policy and Economic Development", *Economic Development and Cultural Change*, Vol. IX, July 1961, Part I, pp. 598-603.

J. Bhagwati, "The Theory of Comparative Advantage in the Context of Underdevelopment and Growth", *Pakistan Development Review*, Vol. II, Autumn 1962, pp. 339-353.

Bhagwati and Ramaswami, *op. cit.*

G. Haberler, "Some Problems in the Pure Theory of International Trade", *Economic Journal*, Vol. LX, June 1950, pp. 223-240.

D.W. Jorgenson, "The Development of a Dual Economy", *Economic Journal*, Vol. LXXI, June 1961, pp. 309-334.

¹³ See, in particular, A.O. Krueger, "Inter-relationships between Agriculture and Industry in a Dual Economy", *Indian Economic Journal*, Vol. X, July 1962, pp. 1-13.

K. Ohkawa, "Balanced Growth and the Problems of Agriculture, with Special Reference, to the Asian Peasant Economy", *Hitotsubashi Journal of Economics*, Vol. II, September 1961, pp. 13-25.

a constant angle. This condition (like the condition of equal marginal rates of substitution in each sector for the neoclassical economy) determines the "contract curve", $O_TA''B''C''O_M$. Due to the nature of the factor-price "disequilibrium" in underdeveloped (dual economy) countries (or formally, because k is less than one), $O_TA''B''C''O_M$ will lie below and to the right of O_TABCO_M . The factor-price lines must be steeper in the modern sector and less steep in the traditional sector than they would be in "equilibrium" (given any division of capital between sectors).

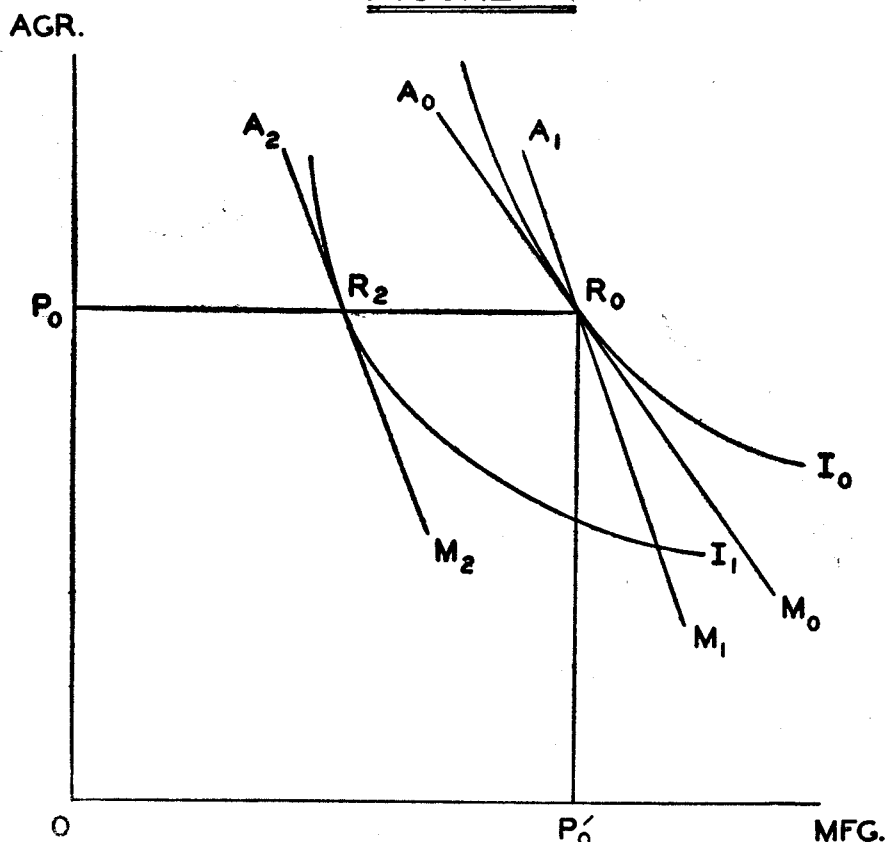
Once the distribution of capital between sectors is specified, the output of each sector can be read off the "contract curve". A transformation locus between the two sectors can be traced out by choosing different distributions of capital between the sectors. This transformation locus is $P_0R_1P_0'$ in Figure II. $P_0R_1P_0'$ will lie inside $P_0R_1P_0'$ (the neoclassical transformation-locus) and, *ceteris paribus*, outside the two unemployment loci. The slope of I_1 and the product-price line to which I_1 is tangent at R_1 will not equal the slope of the transformation locus at the point of production for the same reason outlined above for case three; the wedge between factor-price ratios in the two sectors produces a (related) wedge between product price and product-transformation ratios.

This completes the outline of important features of the various two-product, two-factor, two-sector models. One of the aims of this paper is to clarify, and perhaps dramatize, the differences in assumptions and results of the two-sector models. This section should serve as a basis for the discussion of other differences between models within the framework of the traditional analysis. In the next section, I turn to some problems of discussing institutional rigidities in the context of neoclassical analysis.

III. DEALING WITH RIGIDITIES IN NEOCLASSICAL MODELS

The determination of economic values by institutional rather than economic forces is one of the primary characteristics of the dual-economy model and is its principal difference from neoclassical allocation-models. In this short section, the implications of some of these institutional rigidities are explored in a preliminary fashion and some of the problems for the usual type of economic analysis are pointed out.

The particular institutional determinant under consideration is the allocation of capital and the effect of capital allocation on the determination of the production loci as discussed in the last section. As usual it is assumed that there is homogeneous behaviour within each sector. If capital markets are segmented, if there is inadequate (or nonexistent) intersectoral arbitrage, and if the total supply of capital is divided between sectors by institutional factors, there would be difficulty in defining the transformation locus. There might be only part of

FIGURE VI

a locus in the case where there is limited mobility of capital. In the extreme case of no mobility of capital, there might be only one point at which capital was fully employed. If there is no intersectoral capital movement, a failure to employ the capital available to the modern sector would result in unemployed capital in the economy as a whole.

In the neoclassical models, the demand for final products of the two sectors determines the allocation of capital and labour between the two sectors. Relative factor prices are determined as a part of the allocation process. Such is not the case in the dual economy; and due to this fact, the results of the model are somewhat unusual. For example, take the case in which capital is strictly immobile between sectors. Bhagwati¹⁴ suggests that the product-transformation

¹⁴ J. Bhagwati, "The Theory of Comparative Advantage in the Context of Underdevelopment and Growth", *op. cit.*, pp. 340-341. Bhagwati suggests that both factors are immobile in this case, while here only capital is held immobile. However, since relative factor prices are fixed in the two sectors by institutional, not economic, factors, the result would still be a rectangular transformation locus, since when the level of capital available and the relative factor prices are given, the quantity of labour used by the sector is also determined.

locus in such a case would be a rectangle, since immobility of factors implies that it is not possible to "convert" decreases in one sector's output into increases in the output of the other sector. The situation might be represented as in Figure VI, with the solution Bhagwati suggests at R_0 , with I_0 tangent to A_0M_0 , the terms-of-trade line between the two sectors. However, Bhagwati's conclusion that there would be an equilibrium point at R_0 does not seem to be justified. Factor prices as well as factor availabilities are determined by institutional factors in the dual economy, and it is questionable whether a consistent set of relative product prices could be established at R_0 given the factor-price ratios in the two sectors¹⁵. For example, the relative factor-price differentials between the two sectors might imply (at a given level of capital in each sector) a set of relative product prices represented in Figure VI by terms-of-trade line A_1M_1 (or A_2M_2) instead of A_0M_0 . This would suggest that, given the shape of community preferences, production and consumption would take place at R_2 and level of indifference I_1 instead of at R_0 and I_0 .

Thus, in order for an equilibrium to be established at R_0 there would have to be a set of coincidences that determined relative factor-price differentials consistent with the division of capital between sectors and the set of community preferences. The equilibrium would not be reached by economic forces. There might be unemployed labour and capital due to the institutionally set factor prices and capital allocation, given the particular set of community preferences. Such a situation is represented by the equilibrium at R_2 in Figure VI¹⁶.

The likelihood of an underemployment equilibrium in the presence of fixed factor prices could hardly be called a new idea. However, in the context of the dual economy, where the nature and direction of certain rigidities and differentials is known, it is important that one remain aware of some of the consequences, especially when one is accustomed to using a neoclassical framework of analysis. Some further implications of the rigidities in the dual economy are explored in the following sections.

IV. DIRECT ALLEVIATION OF DUALISM: WAGE SUBSIDIES AND RELATED POLICIES

The question of taxes and subsidies to relieve the problem of "disequilibrium" at the factor level has received a good deal of attention. It may conveniently be broken down into two topics: tax-subsidy schemes in the factor

¹⁵ This is another application of the point brought out by Fishlow and David, *op. cit.*, p. 525 and referred to in the last section when discussing the "disequilibrium" between consumption substitution and product transformation.

¹⁶ Note that Eckaus, *op. cit.*, also was concerned with pointing out that rigidities of a particular sort combined with a proper structure of final demand could result in an equilibrium below full employment.

markets and tax-subsidy schemes in the goods markets. Three recent articles review the theoretical considerations of each type of scheme and reach the same conclusion: in general, when the "disequilibrium" is at the factor level, a proper tax-subsidy scheme at the factor level would potentially reach a higher level of community welfare than the best tax-subsidy scheme at the goods level¹⁷. The reason can be seen readily from the analysis above; any system of taxes and subsidies that does not affect relative factor prices in the two sectors will not move the economy past $P_0R_1P_0'$, even though it might succeed in moving to a higher level of indifference along $P_0R_1P_0'$. Thus, conclude all these authors, tariffs (in the open economy) and other tax-subsidy schemes in the product markets are "second best" solutions¹⁸. "Best" solutions can be achieved only by attacking the problem of factor-level "disequilibrium" at its source. Each method, however, is worthy of further examination in terms of the diagrammatics outlined above in Section II and the differences between the full-employment and unemployment models discussed there.

In the context of the underdeveloped (dual) economy, the factor-price "disequilibrium" that must be attacked indirectly is generally considered to be the wage-rate differential between modern industry and traditional agriculture (and handicraft industry). Hagen¹⁹, followed and clarified by Bhagwati and Ramaswami²⁰, assumed full employment of labour, while Ranis²¹ assumed unemployed urban labour. Since the price of labour in the modern sector is "too high", runs the argument, there should be a subsidy paid on the hiring of labour in that sector. In terms of Figures IV or V, the subsidy would have the effect of flattening the price lines to the modern sector and including the employment of more labour at any given level of output or for any given share of capital allocated to the modern sector. The flattening of the price lines would move the factor-use locus of the modern sector to the left, and it would correspondingly move the product-transformation locus northeast towards the neo-classical locus, thus potentially reaching higher levels of welfare.

The problem of "disequilibrium" capital-prices, suggested by Wai²², is not given adequate attention by any of the authors, but is in fact a part of the "disequilibrium" factor-price ratios. Accompanying the subsidy to labour in

¹⁷ See, Bhagwati and Ramaswami, *op. cit.*

Fishlow and David, *op. cit.*

Hagen, *op. cit.*

It is interesting to note that all three examine "full-employment" dual-economy models.

¹⁸ See, R.G. Lipsey and K. Lancaster, "The General Theory of the Second Best", *Review of Economic Studies*, Vol. XXIV, October 1956, pp. 11-32.

¹⁹ Hagen, *op. cit.*

²⁰ Bhagwati and Ramaswami, *op. cit.*

²¹ Ranis, *op. cit.*, is concerned with the differentials within manufacturing between large-scale modern firms and small-scale traditional firms.

²² Wai, both articles in *IMF Staff Papers*, *op. cit.*

the modern sector should be a tax on capital use (or outstanding debt) in that sector. Both measures would tend to raise the relative price of capital and flatten the price lines to the modern sector. The tax on capital use might succeed in forcing some capital into the traditional sector²³. The tax on outstanding debt would also provide some offset to the inflationary effects of the labour subsidy²⁴.

One point of some empirical importance in the discussion of the labour subsidy concerns the results that could in fact be expected of such a policy. Both Hagen and Bhagwati and Ramaswami imply that both full employment of labour and production on the outer transformation locus could be achieved by the labour subsidy device. But this conclusion is at variance with Eckaus' analysis of the nature of the dual economy. Eckaus has suggested that one of the major causes of unemployed labour in urban areas is a lack of complementary factors of production required in some minimum quantity to employ labour even at very low wage-rates²⁵. Such a situation can be represented by nonhomogeneous production functions or kinked isoquants (fixed factor proportions) or both in the set of diagrammatics used above. How much absorption of labour into the modern sector one should expect following the adoption of a labour subsidy device depends on the technical characteristics (or the supposed technical characteristics) of the production function for that sector. Although the assumption of strictly fixed coefficients seems to be unrealistic empirically²⁶, the importance of *specific* complementary factors should not be overlooked in practice²⁷.

A second point of empirical relevance to the wage-subsidy issue is the effect of such a policy on the demand for and the price of agricultural products. A marked increase in employment of labour in the modern sector, occasioned by the labour subsidy policy, would result in increased demand for agricultural products. This would result in an increase in the price of agricultural wage-goods (and in most formulations of the dual-economy model the increase in the price of wage goods would result in an increase in the money wage-rate)²⁸. A reaction

²³ It should be recalled that the sectoral distribution of capital is likely to be determined primarily by institutional factors unless some positive measures are taken to promote market allocation. The capital-use tax, by discouraging demand for capital in the modern sector, might promote market allocation by creating a further surplus of capital in the modern sector at the existing interest rates received by lenders.

²⁴ The inflationary aspects of a labour subsidy-policy are considered by Ranis, *op. cit.* but ignored by Hagen, *op. cit.*

²⁵ Eckaus, *op. cit.*

²⁶ See, K.J. Arrow, H.B. Chenery, B.S. Minhas and R.M. Solow, "Capital Labour Substitution and Economic Efficiency", *Review of Economics and Statistics*, Vol. XLIII, August 1961, pp. 225-250, where it is suggested that the fixed-coefficients case can be rejected with reasonable certainty.

²⁷ For emphasis on this point in the case of Pakistan, see, J.H. Power, "Industrialization in Pakistan: A case of frustrated take-off?", *Pakistan Development Review*, Vol. III, Summer 1963, pp. 191-207.

²⁸ For an empirical investigation of this type of interaction, see, A.R. Khan, *Wages and Prices in Karachi: A Case Study*. (Karachi: Institute of Development Economics, 1961), where evidence for such a relationship between price of wage goods and the money wage-rate is found.

of this sort is generally left out of the analysis of the effects of wage-subsidy arrangements, but the inclusion of this consideration seems to weaken the empirical case for a wage-subsidy policy. The effects of the wage-subsidy scheme could be shown in terms of diagrammatic representations developed above, although this is not done here. The indifference map would change shape due to the change in the income distribution, and the indifference curves would become flatter in the relevant range as the higher preference for agricultural wage-goods was felt. The inner transformation locus $P_1R_2P_1'$ in Figure II would shift in a northeasterly direction as a result of the wage subsidy (but it would not shift out to $P_0R_0P_0'$ if the price increase in wage goods pushes money wages higher in the modern sector). Equilibrium would be reached at a higher level of output of manufactures, a higher relative price of agricultural products and a lower relative price of manufactures. What will happen to agricultural output is a question that will be left open for the moment.

In the full-employment case, considered by Hagen and Bhagwati and Ramaswami, the impact of the wage-subsidy system on the price of agricultural products would be even more marked than in the unemployment case. Under the assumption of full employment, it is necessary to reduce agricultural output in order to increase the urban labour-force, thus compounding the demand shift in favour of agricultural products with a supply shift out of agriculture. The full-employment model is used by Krueger²⁹ and others to condemn industrialization policies as unrealistic. One problem of the usefulness of the conclusions reached by Krueger and the analysis of Hagen and other "full-employment" theorists is the relevance to many or most underdeveloped countries of the assumption of full employment of labour. This comment is not meant to downgrade the importance of agricultural productivity in development programmes, since there can be an agricultural bottleneck in the growth process under either full-employment or unemployment conditions. However, in the (empirically more relevant?) case of substantial unemployment in urban areas, it is not necessary to assume zero marginal product of labour in agriculture to explain the phenomenon of "unlimited labour" at existing wage rates. The point is obvious once it is made explicitly, but too much of the discussion of central problems facing developing countries takes place under the guidance of theoretical models that are not clear regarding important assumptions.

A minor point of some interest and possible confusion relates to Hagen's analysis and policy conclusions. He recommends providing a subsidy to urban labour equal to the difference between the rural and the urban wage-rates³⁰. This would imply that the rural wage-rate was the "equilibrium" wage-rate

²⁹ Krueger, *op. cit.*

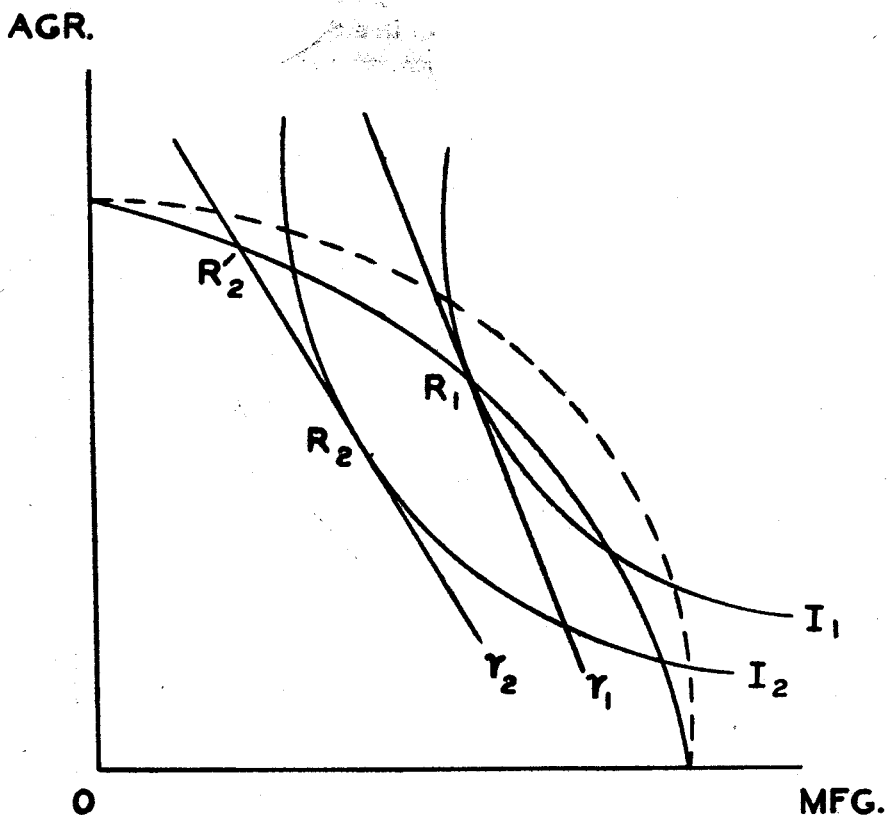
³⁰ Hagen, *op. cit.*, p. 510.

for the economy, which would in turn imply that the traditional sector's factor-use locus was O_TABCO_M in Figure V. But if that is the case, and there is full employment as Hagen assumes, the economy would be on the "contract curve" and the outer transformation locus to begin with. If rural labour is paid its net average product instead of its marginal product, an assumption often made in the dual economy literature³¹, it would not be necessary for the traditional sector to be on the O_TABCO_M locus in order for Hagen's conclusion to hold. In that case, however, it would be necessary for the average net product of labour in agriculture to be equal to the "equilibrium" wage-rate for the economy as a whole, which would be an interesting coincidence.

V. TARIFFS AND COMMERCIAL POLICY IN A DUAL ECONOMY

Since commercial policy has been the primary source of direct application of the dual-economy model to policy analysis, some comments are in order

FIGURE VII



³¹ See, *inter alia*, Krueger, *op. cit.*, or Ohkawa, *op. cit.*

regarding the contribution of the above analysis to the tariff question. The usual graphic analysis is shown in Figure VII. Autarky is represented by production and consumption at R_1 , with level of community indifference I_1 and terms of trade (or relative prices) given by the slope of R_1r_1 . Free trade imposes terms of trade $R_2'R_2r_2$ on the economy, since the country takes external terms of trade as given. Since there is an intersectoral wage-differential, production of (expensive) manufactures is reduced, production of agricultural products increases in response to the more favourable relative price, production in the economy is at R_2' and consumption is at R_2 . The level of community indifference is I_2 , which is lower than I_1 . Thus, the argument goes, prohibitive tariffs resulting in autarky would be better in terms of community welfare than would free trade³².

There are several points at which the usual analysis should be clarified and extended to take a more realistic view of conditions in underdeveloped countries. The possibility or probability of urban unemployment should be incorporated into the analysis. The institutional rigidities in allocation of capital as well as the wage differential, should be taken into account. In particular, one should recognize that if capital is mobile between sectors at all, it is more likely to move in one direction only: from rural (traditional) areas to urban industrial areas. In addition to this there appears to be a bias in labour migration from farm to town. This bias is reflected by the presence of urban unemployment but it is a separate issue analytically. It has already been shown that a dual economy with unemployed labour will produce on a lower transformation-locus than an economy with full employment of labour. As Fishlow and David have shown, "there may only be *one point* on the inner transformation locus at which the market mechanism would establish a consistent set of commodity prices and differential factor payments"³³. In other words, there may be only one set of relative prices (terms of trade) consistent with a given transformation locus, and if different terms of trade are imposed from outside, this could imply a movement to a different transformation locus.

Combining the above considerations it appears that the tariff analysis should be modified somewhat. Such a modification appears diagrammatically in Figure VIII. As the economy abandons autarky and adopts free trade, it moves from terms of trade R_1r_1 to $R_2'R_2r_2$. However, not only may this change be represented by a movement to a lower indifference-curve I_2 , but also it may result in a movement to a lower transformation-locus. This point can be argued from several standpoints. First, if the Fishlow-David proposition stated above holds, a change in the terms of trade would not be consistent with production on the same transformation locus. Second, as production of the modern sector is reduced by the deterioration in its competitive position with imported goods, there is no reason to expect the output of the agricultural sector to increase.

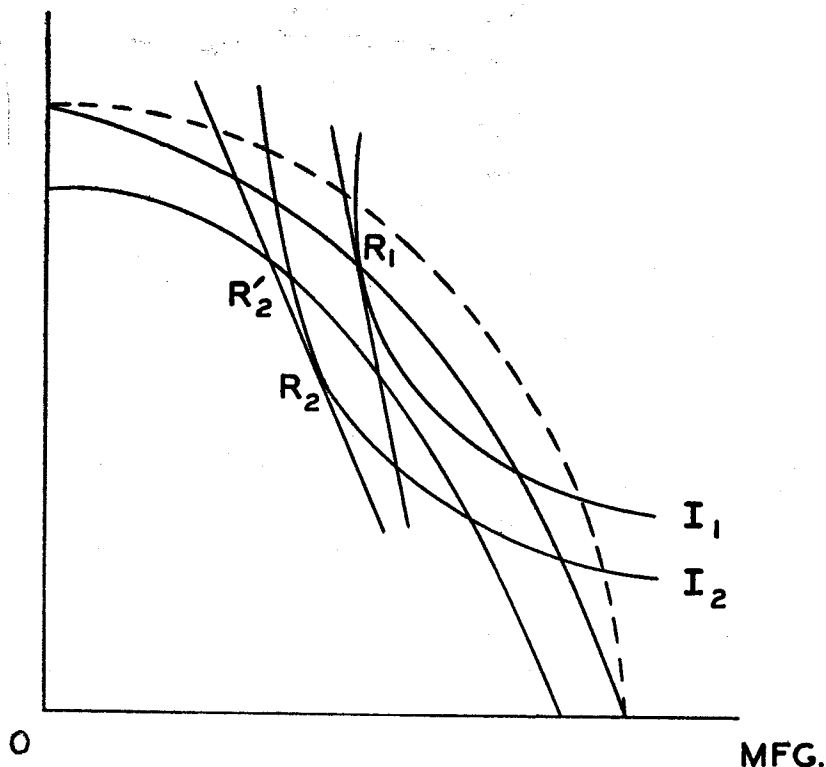
³² This general line of analysis is followed by Haberler, Hagen, Bhagwati and Ramaswami and others, although Bhagwati, *op. cit.*, and Bhagwati and Ramswami, *op. cit.*, have criticised the usual analysis from several standpoints.

³³ Fishlow and David, *op. cit.*, p. 525 (my italics).

This is represented in Figure VIII by the same output in the agricultural sector after free trade as before. The result is due not only to "excess labour" in agriculture to begin with, but also to the fact that labour and capital are likely to be mobile in one direction (rural to urban) only.

FIGURE VIII

AGR.



In partial-equilibrium terms, the inward shift of the transformation locus can be thought of as the result of a decrease in labour employment in the modern sector as manufacturers are forced to compete with lower-priced imports. The demand for labour in the modern sector would contract and labour would become unemployed, but it would not automatically move into agriculture. On the other hand, if the economy went from free trade to protection, the demand for labour in the modern sector would increase and labour would be absorbed from the pool of unemployed in urban areas. There is no need to reduce factor utilization or output level in agriculture in order to increase them in industry. Both the above results can be represented by movements from one

transformation locus to another. Production on the inner locus at R_2' represents an equilibrium position in the sense that there is no tendency to move toward production along $P_0R_1P_0'$. In general, the larger the amount of urban unemployment, the lower the transformation locus on which the economy is operating. The larger the amount of urban unemployment, the greater the potential gain in real output and income from encouraging production in the modern sector³⁴.

Bhagwati and Ramaswami have argued that free trade could result in higher levels of welfare even in the dual-economy case³⁵. Thus, they have provided an exception to the case in which tariffs would improve welfare. The above analysis suggests that in an economy with unemployed labour, inflexible factor prices, and less than complete mobility of factors, the conditions under which their exception to the increased-welfare-by-protection argument holds become even more difficult to fulfill than they themselves suggest.

The line of argument in this section should not be interpreted as a blanket endorsement of protective commercial policy in underdeveloped countries. The analysis is still too aggregative in approach and has left out too many variables to justify such a conclusion. As one example, the subject of growth in a dual economy has not even been raised in the paper, and this is most certainly a subject that should be examined in connection with any major policy decision. Also, as mentioned in the fourth section above, considerations of static welfare suggest that direct wage subsidies would be a better policy (result in higher potential welfare) than tariff protection. But both of these principles have further application to matters of concern to a developing economy, and should not be considered as isolated alternatives in the only policy decision facing a country. The principle involved in the use of factor prices that more accurately reflect social opportunity-costs is important to public economic planning as well as private decision-making³⁶. Likewise, the principle involved in prohibitive tariffs for purposes of commercial policy (for a developing country) can be applied to the discussion of proper tax policy³⁷.

VI. CONCLUDING COMMENTS

The purpose of this paper has been to analyse in more detail the various models that have been used under the blanket heading "dual economy", and to

³⁴ It is important to keep in mind a comment from the second section: the urban unemployment is not of the Keynesian sort due to insufficient aggregate demand but is due to the structure of money costs as reflected in relative factor prices, and the structure of final demand.

³⁵ Bhagwati and Ramaswami, *op. cit.*, pp. 46, 49.

³⁶ For one recent discussion of adjustments in factor prices to be used in planning decisions, see, M. Haq, *The Strategy of Economic Planning*. (Karachi: Oxford University Press, 1963), pp. 40-49.

³⁷ Further research on proper tax policy for an economy with a dual-economic structure is being conducted by the author. The results of this research will be published shortly.

see why different writers have drawn different conclusions about proper policy in a "dual economy". Several remarks are in order regarding the entire exercise.

First, it is hoped that the framework of analysis outlined in the second section will provide a clearer basis for discussion of problems of the dual economy since some of the important assumptions can be made explicit within that framework. In addition, the analytical tools are the same as those generally used in discussion of neoclassical allocation-theory so a comparison in that direction is also facilitated.

Second, the explicit recognition of some of the effects of institutional rigidities on allocation decisions is necessary. The third section above is only suggestive of some of the lines of enquiry that could be followed. It seems to me that there is a good deal of profitable scope for analysis of the effects of institutional factors on economic behaviour in developing countries. When an economy functions in a context of controls (and disequilibrium prices) over foreign exchange, investment projects, direct allocation of particular raw materials or capital goods, protected domestic markets for manufacturers, compulsory sale of certain goods to government agencies, *etc.*, the principles of allocation and economic policy judgement become blurred to say the least³⁸.

Third, it should be recognized that the presence of substantial overt urban unemployment changes the emphasis of certain policies. The one discussed above is the "agriculture-vs-industry" argument (or false argument), but the discussion applies to other policy issues as well. The important point to be made is simply this: in the presence of unemployed labour in urban areas, it is not necessary to enter the argument about marginal products in agriculture in order to show that there is unlimited labour available at going wage-rates.

Fourth, it is important to remember the implications of the last point for discussion of proper commercial policy. In the presence of unemployed labour the case for protection becomes even stronger than in a fully employed dual economy. This is not unrelated to the principle involved in restrictive commercial policy in advanced countries to solve Keynesian unemployment. However, the problem in the less developed countries is structural, not cyclical as in the developed countries.

As the formal models of underdeveloped countries become more refined and easier to manage, the discussion of proper policy in underdeveloped countries will be based on a more adequate footing. It is hoped that this paper will be a contribution to that refining process.

³⁸ Kudos must again go to Haq, *op. cit.*, pp. 49-55 for an initial assault on some of these difficult problems. However, after reading his discussion of "Economic Controls and Policies", ones appetite is merely whetted.