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## Development and Employment in the Open Dualistic Economy

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CENTER DISCUSSION PAPER NO. 110

DEVELOPMENT AND EMPLOYMENT IN THE OPEN DUALISTIC ECONOMY

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## Development and Employment in the Open Dualistic Economy

J.C.H. Fei

G. Ranis

Considerable and rapidly increasing interest has been generated in recent years, among both academicians and policy makers, in the study of LDC unemployment, as a massive problem likely to get larger. Given the inapplicability of the Keynesian insufficiency of effective demand explanation for unemployment the search for an adequate theoretical framework to deal with the problem must, we think, be conducted within the larger context of labor utilization, in particular, and the overall LDC growth process, in general. For it is in the process of growth that an LDC acquires the organizational capacity as well as the complementary factors (entrepreneurs, capital, skill, etc.) to permit the unskilled labor force to be fully employed.

Some of the growth models which have appeared in recent years have, in fact, concentrated on the analysis of underemployment, unemployment and labor utilization. In an LDC of the labor surplus type (i.e. the type in which unemployment is likely to be severe) so-called dualistic growth models have attempted to focus on the analysis of labor reallocation (from agriculture to industry) and on the elimination of disguised unemployment in the process.<sup>1</sup> It is natural for us to inquire as to what more specific empirical and policy light this approach can throw on the problems of LDC unemployment in this type of an economy.

One major shortcoming of the dualistic model in the literature is that it is typically a closed model. This omission of foreign trade renders the model fully applicable only to a few large LDC's (e.g. India, China); moreover,

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<sup>1</sup>e.g. Arthur Lewis, "Economic Development with Unlimited Supplies of Labor," Manchester School of Economics and Social Studies, Vol. 22, May 1954; and J.C.H. Fei and G. Ranis, Development of the Labor Surplus Economy: Theory and Policy, Richard D. Irwin, Inc. 1964.

precludes the possibility of full empirical verification, including the use of trade data.

This paper represents something of a progress report on research on the employment problem in the open dualistic economy of the labor surplus type. In the first part of the paper, we present a modified and more flexible version of the closed dualistic model. In part II the model is extended and opened to trade. In the third section, we present the ground work for implementing the model statistically using Korean and Taiwanese data, as well as some preliminary implications for policy.

#### I. Labor Utilization in the Dualistic Economy

Let us begin by examining the relevance of the labor supply conditions for industrial (or better, non-agricultural) employment in the case of the labor surplus dualistic economy--first for the static and then for the dynamic case. During any given year the industrial sector of such a dualistic economy will have to provide employment opportunities for the expanding labor force, the ranks of which are usually swollen by population growth and the migration of portions of the rural labor force to the cities. The supply of labor to the industrial sector is a market phenomenon and can be described by a supply curve (SS in diagram 1a) which states that the industrial sector will, in general, have to pay a higher real wage, in terms of industrial goods, in order to acquire a larger labor force.

The industrial sector, moreover, invariably finds it more difficult to provide more employment opportunities when this supply curve is wage-inelastic, (i.e. when wage costs increase sharply). For any given demand curve for labor (e.g. the  $MPP_L$ -curve marked DD' in diagram 1a), a sharply

rising supply curve will curtail employment (to the point  $L_0$ )<sup>1</sup>, as contrasted with a more "favorable" supply condition as typified by the "unlimited supply case" (i.e. the horizontal supply curve SS") under which industrial employment would have reached the higher magnitude  $L'_0$ , with equilibrium at "a".

Moreover, if the industrial entrepreneur is accustomed to sharp rises in wage costs, and expects more of the same, he is likely to defend this encroachment on his profits by means of labor saving innovations. This can be shown by a distortion of the demand curve  $DD'$  to the position  $CC'$ --representing a very labor saving innovation.<sup>2</sup> Industrial employment is curtailed to the equilibrium position  $a'$  with  $L''_0$  units of labor. Thus, rising wage costs are unfavorable to the solution of the employment problem due to these dynamic effects, in addition to the static effects already discussed.

Sharply increasing wage costs will deter industrial employment for yet another, also dynamic reason; for when wage costs increase, profit margins decline (from  $Sa''D$  in the unlimited supply case to  $S'aD$ ). Since it is partly through the reinvestment of industrial profits that capital accumulation takes place, the amount of industrial employment in the next period is curtailed by the profit and investment depressing effects of wage increases in this period.<sup>3</sup>

For all these reasons, we can safely assume that increasing wage costs (i.e. an inelastic supply curve of labor to the industrial sector) is

<sup>1</sup>Assuming the industry to be competitive, so that the equilibrium point is established at "a".

<sup>2</sup>Technically the  $CC'$  curve is shown to represent a very labor saving innovation with the same "innovational intensity" as curve  $DD'$  (i.e. the area  $DCe = \text{area } e_aC'$ ). In diagram (1b) below the consistent total productivity curves are indexed by "d" (for  $DD'$  above) and "c" (for  $CC'$ ). In the same diagram, the total wage cost curve may be shown. When employment is cut from  $L_0$  to  $L''_0$ , the saving in wage cost is  $U_s$  (taking on a higher magnitude if the supply curve is steeply rising) while the loss in revenue is  $Q_r$  (taking on a smaller magnitude the more successful the effort toward labor saving innovation).

<sup>3</sup>See Arthur Lewis, op. cit.; Charles P. Kindleberger, Europe's Postwar Growth: The Role of Labor Supply, Harvard University Press, 1967; and Miyoei Shinohara, Structural Changes in Japan's Economic Development,

unfavorable to the solution of the employment problem when that problem is defined as converting disguised agricultural unemployment into open industrial employment. The forces that lie behind the demand and supply curves (i.e. the forces that determine their shape) will now be briefly scrutinized.

### The Supply and Demand for Labor

The analysis of the labor supply (i.e. the factors which lie behind the SS-curve) involves population growth, the initial extent of underemployment, as well as the production conditions prevailing in the agricultural sector (i.e. the sector that releases labor). This supply aspect will be treated in great detail in the rest of this paper, as it lies at the heart of the present model. A few words may be added here, however, on how our demand analysis fits into the same framework.<sup>1</sup>

Two types of factors determine the demand for labor, i.e. lie behind the demand curve DD': capital accumulation and innovation behavior. Given the supply curve, more labor will be absorbed (i) the faster the rate of capital accumulation and (ii) the stronger innovations and the more biased in a labor using direction. Both factors (i and ii) contribute to a faster rise of  $MPP_L$ . These factors can be traced, in turn, to the savings capacities as well as the quality of the economy's entrepreneurs.

In a dualistic economy there exist two main sources of the saving fund for the industrial sector<sup>2</sup>: the reinvestment of industrial profits and the channelization of the saving of the agricultural sector to finance industrial

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<sup>1</sup>This analysis is more completely summarized in our "Innovation, Capital Accumulation and Economic Development," American Economic Review, June 1963.

<sup>2</sup>Abstracting from foreign capital in the closed economy.

capital formation. In a country with a large agricultural sector and a small industrial sector to begin with, the consequence of industrialization is that the relative importance will shift from agricultural supply (intersectoral finance) to industrial profits (intra-sectoral finance) over time--but that the former dwarfs the latter in the early stages. Saving is thus conveniently analyzed as a crucial aspect of intersectoral relations (between agriculture and industry) and will be so treated below.

Entrepreneurial behavior with respect to the bias or slantedness of innovations is governed mainly by their sensitivity to factor prices as well as the relative market potential for "labor intensive products." Entrepreneurs are most likely to adopt labor using innovations when they can expect the condition of low wages to prevail and can anticipate the expansion of markets for labor intensive products. Thus, the innovation aspect is likely to be a quantitatively significant factor when the condition of an unlimited supply of labor prevails and the economy is ready to export labor intensive industrial manufactured goods to the world market. These factors will be focal points of the analysis of the open dualistic economy--and will be treated below.

#### The Determinants of the SS-curve

The factors behind the supply curve of labor (SS) in the dualistic economy include the size of the total population, its allocation between the two sectors, and the productivity of the agricultural labor force. To see this, suppose the horizontal distance  $OO'$  (diagram 2) represents the total population or labor force in the economy. Let D be the allocation point which divides the total labor force into industrial labor (OD) and agricultural labor ( $O'D$ ). A further reallocation of labor out of the agricultural sector could be represented by the allocation point  $D'$ .

Suppose, with fixed land, the total productivity of labor in agriculture is given by the  $TPP_L$ -curve  $O'T$  in diagram 2b. When the agricultural labor force decreases from  $D$  to  $D'$ , total agricultural output decreases from height  $Q$  to  $Q'$ . The supply of agricultural goods (mainly food) available per unit of total population in the economy also decreases (from  $\tan \theta$  to  $\tan \theta'$ ). It is this diminution in the supply of food, per capita, that causes the real wage to increase in the industrial sector, i.e. generating the increases in the supply curve, from  $w$  to  $w'$ . In a closed dualistic economy the agricultural "short fall" causes a rise in the supply price of labor to the industrial sector because, given a shortage of food, the terms of trade will turn against the industrial sector--forcing the latter to pay a higher price, in terms of industrial goods, to acquire the food needed to sustain the industrial labor force.

The policy implication of the above is clear. For a country which wants to grow and to rely on its own labor force to provide its food, increasing agricultural productivity is the key to the solution of the employment problem in the industrial sector. For it is only through a successful program of agricultural modernization that the threat of industrial real wage inflation can be averted.

If, as a consequence of population growth, the economy's total labor force increases (say from  $OO'$  to  $OO''$  in diagram 2b), the effect on industrial employment is moot. In the case depicted, when the labor allocation is located at  $D''$ , the supply of food, per capita (i.e. the slope of  $O''a''$ ) is at the same level prevailing at  $D$  before population increase (i.e. the slope of  $O'a$ ). Thus the industrial labor supply curve in diagram 2a shifts upward (now passing through point  $e$ ) and hence industrial employment decreases absolutely in spite of the increase in the number of total employables. To



supply the same amount of food, per capita, the increase in the agricultural labor force is, in fact, greater than the increase in the total labor force as a consequence of the law of diminishing returns to land. When the law of diminishing returns to land is not so severe, it is possible that the supply curve will shift downward permitting an absolute increase in total industrial employment. However, even in this case, the fraction of the labor force employed in industry, i.e. the relative size of the industrial labor force ( $OD/OO'$ ) will always decline.<sup>1</sup>

A more favorable "supply condition" (as represented by a downward shift in the supply curve) may be traced to the possibility of technology change in agriculture. In the closed economy an "increasing supply price of labor" (i.e. a positively sloped SS-curve) can be avoided only if efficient agricultural innovations accompany the labor allocation process. Agricultural innovations are especially "indispensable" when there is substantial population increase and when the "success" of employment performance is measured not only in terms of the absolute size of the employed industrial labor force but also by the increasing fraction of the total labor force employed in that sector.

#### Consumer Preference: Labor Allocation and Food Rationing

Any rigorous analysis of the determination of the internal terms of trade between the agricultural and the industrial sectors must, by necessity, take into consideration consumer preference with respect to agricultural vs. industrial goods. In diagram 3a, let the TPF-curve be the total productivity

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<sup>1</sup>Suppose the fraction of industrial employment ( $OD/OO'$ ) is maintained at the same level as population increases. Then the level of agricultural labor productivity necessarily declines because the amount of labor input in the agricultural sector increases. The supply of food available per head will then decline. If  $D^*$  maintains the same industrial employment fraction as  $D$  (i.e. if  $OD^*/OO'' = OD/OO'$ ), then the point  $e'$  in diagram 2a must be below the supply curve.

of labor in the agricultural sector (measured to the left) with  $OO'$  as the total labor force. When the agricultural labor force is established at  $Oa$ , the total agricultural output at  $Q_a$ -units leads to<sup>a</sup> food supply of  $\tan \theta$ , (slope of the straight line  $OQ_a$ ) on a per capita basis. This per capita food supply may be represented by the vertical distance  $bs$  in diagram (3b), and in this way for each allocation point a per capita food supply curve  $OP$  for the economy is generated. This curve describes the supply of food available, per capita, as a function of the labor force in the agricultural sector.

In diagram insert (3c), suppose the consumption indifference map of a typical worker (farmer or industrial worker) is shown. If agricultural goods are measured on the vertical axis and industrial goods on the horizontal axis, we may let the horizontal line  $MM'$  represent the caloric minimum level. The entire indifference map must then lie above  $MM'$  and the indifference curves flatten out near  $MM'$ . If we let  $w_a$  be the institutional real wage (IRW), i.e. the real wage in terms of agricultural goods, determined exogenously, prevailing in the agricultural sector, a price-consumption curve (PC-curve) emanating from point  $w_a$ , marked off on the vertical axis, may be shown. If the intersectoral terms of trade are represented by the slope of the straight line  $w_a w_i$ , the consumption equilibrium point is established at point  $e$ , the per capita demand for food at  $ev$  units, and the per capita demand for industrial goods at  $eu$  units.

In diagram (3d), let the price-consumption curve (PC) and the consumption equilibrium point  $e$  (i.e. relevant for the terms of trade  $w_a w_i$ ) be reproduced. For these terms of trade, the consumption equilibrium requires that  $ev$  units of agricultural goods be supplied on a per capita basis. This in

turn determines a consistent pattern of labor allocation so that the supply of food also per capita equals  $ev$ . In diagram (3b), this consistent point of labor allocation (i.e. in terms of market clearance) is located at point  $D_e$  (i.e.  $s_e D_e = ev$ ). Suppose less labor (indicated by  $D'$ ) were left in the agricultural sector, causing a decline in per capita food supply (to level  $D's'$ ). The resulting shortage of food would now lead to an increase in the price of food (or to more unfavorable terms of trade for the industrial sector). In diagram (3a), the new terms of trade are now given by the slope of  $w_a w'$ , leading to a new consumption equilibrium point  $e'$  where the demand and supply of food are again equated. In any society the terms of trade are essentially an organizational instrument to ration the relatively scarce commodity, in this case food.

#### Labor Mobility and Labor Supply

The IRW, i.e.  $w_a$  in diagram (3d), is assumed to be the real wage, in terms of agricultural goods, prevailing in the agricultural sector. Suppose there exists no wage gap between the two sectors and there is perfect labor mobility so that the real wage  $w_a$  is also the real wage relevant for industrial workers. The value of this real wage, in terms of industrial goods, is then precisely  $w_i$ , with  $Ow_i$  units of industrial goods having the same exchange value as  $Ow_a$  units of agricultural goods, at the given terms of trade. Similarly, when the average food supply falls, the new equilibrium position  $e'$  implies that the equivalent of the same IRW in terms of agricultural goods is now higher in terms of industrial goods (i.e.  $w' > w_i$ ). Thus we see that the continuous allocation of labor out of the agricultural sector exercises upward pressure on the industrial real wage--working through the market in which a shortage of food leads to higher food prices.

In diagram (3e) let the 45-degree line  $O'O''$  be shown so that the country's total labor force  $OO'$ , as well as its allocation, can now also be measured on the vertical axis of diagram (3f). Starting from the first equilibrium point  $e$  in diagram 3d, we can then locate the industrial labor force ( $O'D_e$  in diagram 3b) and, with the aid of the 45-degree line,  $OL_e$  in diagram (3f) (i.e.  $OL_e = O'D_e$ ). In other words, for the given industrial real wage  $w_i$  consistent with equilibrium at  $e$ , the supply of labor to the industrial sector is  $OL_e$ --with the actual supply point determined at  $E$ . Similarly, for industrial real wage  $w'$ , the supply of industrial workers is  $OL'$  ( $=O'D'$  in diagram 3b) and the actual point on the industrial labor supply curve is located at  $E'$ . In this way the supply curve of industrial labor, i.e. the  $SS$ -curve in diagram 3f is determined, i.e. traced from points  $E, E' \dots$  for different terms of trade and (consistent) allocation points and per capita availabilities of food.

Labor in the LDC may not, in fact, be perfectly mobile due to the real costs of moving as well as the reluctance of farm labor to migrate to the city except at a higher level of real wages.<sup>1</sup> In fact, most of the evidence indicates the existence of wage gaps of from 50% to 300% in different parts of the developing world. The existence of such a wage gap can be illustrated in diagram 4c by two price-consumption curves--the higher one corresponding to the higher industrial real wage in terms of agricultural goods ( $v_a > w_a$ ). Given terms of trade are indicated by the pair of parallel lines ( $w_a w_e$  and  $v_a w_e'$ ) determining the actual industrial real wage  $w_e'$  under conditions of a wage gap. We now know the consumption demand for food by a typical industrial worker ( $Oh$ ) which is now different from that of the typical

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<sup>1</sup>Aside from exogenous government and union pressures.

farmer (Oj). The allocation of labor as between the two sectors is then indicated by the point  $D_e$ , in diagram 4a, just below point  $s_e$ , which is the point of intersection of the straight line  $vh$  with the food supply curve.<sup>1</sup> With the same 45-degree line construction (diagram 4b), we now obtain the point E on the labor supply curve (diagram 4d). Thus, when there exists a wage gap, the SS-curve of labor is deduced on practically the same principles as in the perfect factor mobility case.

What lies behind the industrial labor supply concept is thus, first, the notion of a given institutional real wage. A particular supply price of labor (i.e. the real wage in terms of industrial goods) then corresponds to some terms of trade which, given consumer preference, leads to a consistent allocation point and determination of the per capita demand for food--with or without a wage gap. Labor allocation between the two sectors must always be such as to ensure that the per capita demand for food is met, i.e. the market for agricultural goods is cleared.

#### Market Clearance and Inter-sectoral Finance

Let us return for a moment to diagram (3b), and assume that the labor allocation point is at  $D_e$  with total agricultural output described by area  $OO'a'b'$ . This output is distributed partly as wage payment to farm labor and partly to landlords as rental income--or agricultural surplus. Notice that for the given institutional real wage,  $w_a$ , total agricultural wages amount to area  $OD_e C'w_a$ . Through the construction of the two (dotted) parallel lines  $a'c'$  and  $gb'$  the two shaded areas are rendered equal. Thus total

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<sup>1</sup>The total consumption demand for food is area  $D O_j u$  (for agricultural labor) plus  $D O' m n$  (for industrial labor), while total food output is area  $OO'ab$ . That supply equals demand is assured by the equality of the two shaded areas, by construction.

farm output (area  $OO' a'b'$ ) is partitioned into a wages share (area  $D_e Ob'a'g'g$ ) and total agricultural surplus (rectangle  $D_e O'g' g$ ). The vertical distance  $D_e g$  is AAS, (average agricultural surplus), i.e. the surplus food available per unit of allocated industrial worker.

For the given consumption equilibrium  $e$  (and the real industrial wage  $w_i$ ) in diagram 3d total wage income of the industrial labor force is area  $Ow_i E L_e$  which can be partitioned into industrial workers' own consumption of industrial goods ( $OVV'L_e$ ), and industrial goods delivered by industrial workers to the farm sector in exchange for food (area  $VV'Ew_i$ ). At the given terms of trade, this latter area can be seen to have the same exchange value as  $O'D_e s_e a'$  units of food. Thus, a portion of the industrial wage goods will be spent on food supplied by farm workers (remember  $gg'a's_e = s_e c'w_a b'$ ) while the other portion is exchanged for the total agricultural surplus ( $O'D_e gg'$ ).

The notion of the "supply" of labor to the industrial sector as introduced at the very beginning of our paper is thus indeed a more complex and analytically rich concept than might be suspected at first glance. What really lies behind the familiar supply price phenomenon are conditions related to agricultural production, consumer preference, labor allocation and mobility, as well as phenomena related to intersectoral finance. Returning briefly to diagram 1a, we thus see that at the given short run employment equilibrium position  $a$ , there exist at least two sources contributing to the investment fund, i.e. the reinvestment of industrial profit (area  $as'D$ ) and the ownership of industrial goods accruing to owners of the agricultural surplus (area  $bb'S'a$ ). Since the growth of industrial employment through time is in large part a function of investment and industrial capital accumulation, the owners of the agricultural surplus (TAS) contribute in this fashion to the solution of the industrial employment problem over time.

Agricultural Productivity and Population Growth

The implication of the above is that in a closed dualistic economy with a relatively large agricultural base, the solution of the economy's employment problem over time, in the agricultural as well as in the industrial sectors, must be based on the modernization of agriculture. To see this more clearly, we may note that the caloric minimum level of consumption  $OM'$  (in diagram 3d) represents an ultimate upper limit to the expansion of industrial employment in the sense that a minimum amount of food ( $OM'$  times the total population) must be produced--and hence a minimum amount of labor kept on the farm--if people are not to starve. This upper limit on industrial employment can only be removed through agricultural productivity increases in the closed economy case.

In diagram (3b), the industrial employment ceiling is given at the point  $M^*$ , which lies directly below the point  $q$  where the food supply curve intersects the (extended) caloric minimum line  $M'M$  (diagram 3d). The same industrial employment ceiling is shown as  $L^*$  in diagram (3f) so that the labor supply curve rises sharply and approaches the ceiling employment  $L^*$  asymptotically. Near  $L^*$ , when the actual output of food per capita approaches the caloric minimum, the supply curve  $SS$  tends to become perfectly inelastic. Such a sharp or "prohibitive" rise in the industrial real wage is usually but a signal of an impending food crisis, i.e. further expansion of industrial employment and output is no longer possible because of an impending absolute shortage of food.

Population pressure will, of course, serve to worsen this problem. In diagram 5a suppose the population increases from  $AO$  to  $AO'$  and thus depresses the food supply curve by the same "proportion" (from  $AS$  to  $AS'$ ).

To produce sufficient food to meet the caloric minimum level (AM) before the population increase, the minimum agricultural population required is given as  $M^*$ --and the distribution of the population between the two sectors by the slope of the radial line AR (diagram 5b). After the population increase, the economy can no longer maintain the same ratio of population distribution since that would put the supply of food, per head, at point q (via point  $\bar{R}$  in diagram 5b) which is below the caloric minimum. To maintain the caloric minimum, the population retained in agriculture must instead increase back to point  $M'$ , with the distribution indicated by the slope of  $AR'$ .

Thus, as population increases, the absolute size of the industrial labor force required to produce the caloric minimum per capita supply of food may either increase or decrease. In the specific case illustrated in diagram 5b, there is hardly any change in the absolute size of the industrial labor force (from  $OL$  to  $OL'$ ) so that the labor supply curve remains approximately unchanged; i.e. when the demand curves for industrial labor (i.e. the  $MPP_L$  curves in diagram 5d) are given, approximately the same absolute amount of industrial employment will be maintained.

In a closed economy which has to grow its own food, a population increase will thus in and of itself not necessarily worsen the urban unemployment problem (in the sense that farm laborers will migrate to the cities to seek jobs). If agriculture is stagnant, most of the increased labor force will have to be used to grow food--as long as its marginal product does not decline to zero--for the country to survive. The real problem with such population pressures in agriculture is the resulting absence of growth, in the sense that an increased proportion of the larger population will have to stay in lower productivity agriculture leaving the industrial sector with a smaller relative weight, and the total economy with a lower per capita product.



But a larger population will worsen the industrial employment problem in another way as well, i.e. through its effect on saving. In the case illustrated in diagram 5d, the demand for industrial labor will rise, say from  $D_0$  to  $D_1$  from one period to the next, as a consequence of investment generating additional employment (in the amount  $\Delta L$ ). The magnitude of the additional amount of labor absorbed depends critically upon the size of the investment fund (composed of the reinvestment of industrial profits plus the channelization of agricultural surplus). Population growth thus depresses total and hence average agricultural surplus and industrial employment.<sup>1</sup>

While mild population pressures may thus have uncertain consequences for the number of workers employed in industry, persistent (or high) population pressures will definitely reduce industrial labor absorption. In diagram 5a, suppose the population increases to level  $AO''$  and the food supply curve is consequently depressed to the level of the  $AS''$ -curve. In order to produce enough food to maintain everyone at the caloric minimum all labor must now be retained in agriculture, i.e. the industrial employment ceiling is reduced to zero. When the closed economy is that close to the margin of survival, efficient employment is no longer the crucial social problem. The country instead faces the more immediate problem of starvation and social upheaval.

Thus, while population pressure prevents a high proportion of labor from being employed in the industrial sector, the stagnation of agricultural technology can impose an absolute upper limit to industrial employment.

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<sup>1</sup>As long as the phenomenon of disguised unemployment exists, i.e. agricultural real wages exceed the marginal product of agricultural workers, an increase in the agricultural population will always depress the total agricultural surplus (TAS). In the case depicted here, the increase in industrial employment (by  $\Delta L$ ) happens to be less than the population increase ( $OO'$ ) and hence the total agricultural surplus decreases. The AAS thus decreases for two reasons: first, because the TAS declines, and second, because there is some increase in total industrial employment.

Referring again to diagram 5d, a continuous upward shift in the demand curve for labor will eventually yield only negligible additions to industrial employment. In the absence of some sort of balanced sectoral expansion of productivity, i.e. unless agricultural labor productivity advances along with industrial labor productivity, the country may not be able to further expand its efficient non-agricultural employment base.

In order to ensure continuous expansion of such employment agricultural productivity will have to increase--mainly, we assume, as a consequence of improvements in technology.<sup>1</sup> Such a case is demonstrated in diagram 6a which shows the food supply curve being raised successively through time ( $S_1, S_2, S_3 \dots$ ). Given the caloric minimum, the industrial employment ceiling is then gradually expanded ( $L_1, L_2, L_3 \dots$ ), leading to "upward" shifts of the labor supply curve. The fact that, at the same supply price, the industrial sector can now acquire more labor is due to the success in the modernization of agriculture.

An idealized intersectoral balanced growth path may then be characterized by a constancy in the terms of trade (slope of  $w_a w_i$  in diagram 6b). In this case, the expansion of the industrial capital stock (and shifts in the industrial labor demand curve  $D_1, D_2, D_3 \dots$  in diagram 6d, on the one hand, and the expansion of agricultural productivity, on the other, occurred in a "balanced" fashion so that the employment equilibrium points ( $e_0, e_1, e_2 \dots$ ) trace out a locus satisfying the condition of constant real wage (i.e. the "unlimited supply of labor" condition). Along such a balanced growth path the employment of labor gradually shifts from the agricultural to the industrial sector (indicated by  $E_1, E_2, E_3 \dots$  in diagram 6a). This is

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<sup>1</sup>Capital accumulation is not ruled out but may be less important in the land-limited labor surplus type of economy.

"ideally," how the employment problem (i.e. the labor utilization and allocation problem) is solved in the closed dualistic economy.

The case of completely "balanced" growth is obviously an unrealistic razor's edge or borderline case, which, however, can help us to distinguish between two possible types of development over time. The dualistic system may develop with something of an industrial bias over time (indicated by the wage-path  $U^*$  in diagram 6d) if the industrial real wage gradually increases. Conversely the system may develop with something of an agricultural bias (or a somewhat declining industrial real wage as indicated by the wage path  $V^*$ ). In the case of development with an industrial bias there will be a gradual worsening of the industrial sector's terms of trade (i.e. a rise in the relative price of food). The opposite is true for the case of agricultural bias in the long run.

A long term industrial bias may be caused by technology advances in the agricultural sector which lag behind industrial capital accumulation. This phenomenon in turn, may be caused by a basically unfavorable land (and natural resources) endowment and/or insufficient attention having been paid to the modernization of agriculture. In other words, a secularly lagging agricultural sector may be partly a matter of economic-geographic necessity and, partly man-made. Whatever the causation, the net result is that the pace of expansion of industrial sector employment and output also slow down--necessitated by a rise in the industrial wage. The more stagnant agricultural technology, the more labor will have to be kept on the farm. A similar (and symmetrical) interpretation of the causes and consequences of development with a long-run agricultural bias (empirically less likely) could easily be presented.

### The Turning Point

The analysis of the closed dualistic model thus far has assumed that the institutional real wage in agriculture ( $w_a$ ) is constant; in fact, we know that this real wage is likely to increase through time. According to the original Lewis thesis, the constancy of the institutional real wage (i.e. "the unlimited supply of labor condition") will give way to an increasing real wage when surplus labor is exhausted. What we have called the turning point marks off not only an early phase of real wage stability from a later phase of increasing real wage but also marks off two distinct ways in which wages are determined: an early phase in which agricultural real wages are determined by an institutional consensus, giving way to a later phase when wages are determined by market forces. For this reason, the turning point between these two phases was referred to as the commercialization point.<sup>1</sup> A turning point thesis of this type can be easily demonstrated within the framework of the present paper--by showing that  $w_a$  must coincide with the marginal product of agricultural labor ( $MPP_L$ ) after the turning point.

The behavior of the IRW before the turning point is a function of institutional forces determining the distribution of income in the agricultural sector. In the absence of any purely economic theory governing this determination it is our conjecture that these institutional forces will operate in such a way that  $w_a$  increases at best only gradually and moderately, probably in some lagged relation to changes in the average labor productivity in agriculture. (In other words, the real agricultural wage tends to be higher the higher average labor productivity.) Thus, the two stages thesis of wage

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<sup>1</sup>See Fei/Ranis, Development of the Labor Surplus Economy

behavior in a labor surplus economy is that moderate wage increases are likely to give way to more rapid wage increases after the turning point. In diagram 7a the idealized Lewis turning point thesis is described by the balanced growth path with the turning point  $t_c$  indicated as the commercialization point. When, more realistically, the IRW increases somewhat before the turning point, the growth path of  $w_a$  is now given by what we have labelled the "realistic balanced growth path" with a moderately increasing  $w_a$  giving way to a sharply increasing  $w_a$  after the turning point. The meaning of "balanced growth" here is that, even if the terms of trade are constant, the real wage in terms of agricultural goods is likely to be represented by such a curve.

The value of the real wage in terms of industrial goods may, of course, deviate from this realistic balanced growth path depending upon the rate of increase of agricultural productivity and the resulting terms of trade. The two alternative possibilities, discussed earlier, are shown in diagram 7a as the "Taiwan type path" and the "Korea type path." The "Taiwan type path" depicts the case where, because of the relatively higher rate of expansion of agricultural productivity, what we have called an agricultural orientation results, i.e. as the terms of trade do not deteriorate for the industrial sector, the real wage in terms of industrial goods does not go up as fast as indicated by the "realistic balanced growth path." The opposite is true for the "Korea type path" in which the relatively slow expansion of agricultural productivity leads to a worsening of the industrial sector's terms of trade, with the real wage in terms of industrial goods rising at a more rapid rate than indicated by the "realistic balanced growth path."

A consistent pattern governing the comparative behavior of agricultural productivity and the intersectoral terms of trade in these two types of cases is shown in diagrams 7c and 7b respectively. In diagram (7c), the rate of growth of agricultural productivity for the case of Taiwan in the decade of the early 50's to early 60's is given by curve a b c d and that for Korea by curve a' b'. In diagram (6b) we show the time path of the terms of trade for each country, consistent with this behavior of the rate of expansion of agricultural productivity. In the case of Korea, the terms of trade move consistently against the industrial sector; in the case of Taiwan such an upturn of the terms of trade occurs only much later.

The behavior of the industrial wage is thus subject to the influence of a number of forces i.e. the initial supply of surplus labor, the strength of population pressures, and agricultural performance. The picture becomes even more complicated, but also more realistic, when we take into consideration the open economy where all the above conclusions are subject to modification by virtue of the option of international trade. For the picture we have drawn so far, that of the likelihood of persistently unbalanced growth, is consistent only with closed dualism. In the case of a secular big push for industrialization, relative agricultural stagnation, or, for example, the persistent increases in food prices, will, if trade is possible, ultimately force the industrial sector to seek a cheaper source of supply of food abroad. When this occurs the arrival of imported food tends to stabilize domestic food prices and, for this very reason, workers can once again be drawn out of the agricultural sector at a quicker pace since they are no longer needed to grow food. The industrial sector can use the thus allocated workers to produce labor intensive industrial goods catering to the foreign market--in

order to help pay for the additional food imports. Thus the pace of industrialization is likely to be quickened as the economy is opened to the opportunity of trade. The implications of trade for the empirically less likely alternative of "agricultural orientation" can be explained in a symmetrical fashion. These are problems, then, of employment and development in the open dualistic economy to which we shall now turn.

## II. Labor Utilization in the Open Dualistic Economy

In the open dualistic economy the industrial sector has the option of obtaining its food from the rest of the world. Consequently the internal terms of trade must be compared with the international terms of trade. Returning to diagram 6, suppose the slope of the straight line  $w_a \bar{w}$  in diagram 6b represents the international terms of trade according to which food is initially relatively more expensive to import than to produce domestically (i.e. as compared with the slope of  $w_a w_i$ ). Thus, initially, the country is a food producer and exporter. Continuous development with an industrial orientation as we have defined it, e.g. after point J in diagram 6d, will, sooner or later, reverse this situation. If the domestic agricultural sector is thus "neglected," the internal terms of trade facing the industrial sector will gradually worsen until they approach the international terms of trade, (i.e.  $w_a w_i, w_a w_i', w_a w_i'' \dots$ ). At that point the country ceases to be an exporter of food and, instead, becomes a net importer of food.

In the case of the small (price-taking) open dualistic economy, the domestic terms of trade will thus be permanently pinned to the international level (i.e.  $w_a \bar{w}$ ). Because of this possibility of resorting to food imports, the terms of trade will no longer continue to turn against the industrial

sector, and hence industrial real wage stability can be sustained. In diagram (6d), as food imports become competitive, any further expansion of demand for industrial workers ( $D'_1, D'_2, D'_3 \dots$ ) will lead to employment equilibrium points ( $g_1, g_2, g_3$ ) implying a constant real wage. The country can now sustain a much higher pace of industrial output and employment growth in the face of relative agricultural stagnation than would have been possible in the closed economy.

The historical British and Japanese experience, as well as that of contemporary Taiwan in historical perspective, illustrate such a process of industrial orientation in the context of an open economy. Countries with a relatively poor natural resources base eventually must rely on the exportation of industrial manufactured goods to secure the needed food and/or agricultural materials to keep the process going. The question is--and here is where Taiwan and Korea differ--whether the effort is initially made to extract available productivity increases from agriculture (i.e. Taiwan) or agriculture is neglected from the outset and resort to imported foods comes relatively "early" in the growth and labor reallocation process (i.e. Korea). At the proper time, depending on the potential for further domestic agricultural productivity increase, an open door policy to food imports (e.g. via repeal of the Corn Laws in the U.K. and through the Japanese food imports from her colonies after 1890,<sup>1</sup> a direct impact on lower food prices, moderating industrial real wages and encouragement of labor intensive industrial exports could be achieved. Taiwan started to import food after her own technological possibilities began to peter out in the mid-60's. On the other hand,

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<sup>1</sup>Y. Hayami and V. W. Ruttan, "Korean Rice, Taiwan Rice and Japanese Agricultural Stagnation: An Economic Consequence of Colonialism," Quarterly Journal of Economics, November 1970.



know, whose natural resource endowment is at least as unfavorable in the long run, has perhaps not taken sufficient advantage as yet of existing possibilities for substantial increases in agricultural productivity in the short run.

In summary, if a very large fraction of the population initially resides in the agricultural sector, the country should concentrate, first, on agricultural policy as a prerequisite for solving its industrial unemployment problem. However, the country may have such an unfavorable resources endowment that additional agricultural efforts will sooner or later run into severely diminishing returns, including to agricultural research and development--before the commercialization or turning point is reached. If that happens, the correct policy is clearly not to continue expending energy and resources on agricultural productivity change, but to exploit one's changing comparative advantage, which now begins to lie in export substitution, i.e. to turn to the substitution of manufactured industrial exports and the importation of primary products. Qualitative growth in the open economy case can bring about a faster pace of industrialization, i.e. a faster rate of expansion of industrial employment and output, but it can also be misused, i.e. the attempt made, sometimes encouraged by artificially cheap P.L. 480 imports, to short-cut the problem of domestic agricultural mobilization even when substantial reserves of agricultural productivity do exist. In that case the country pays the price of doing without the substantial contribution of the potential agricultural surplus to the saving fund--and thus the pace of labor reallocation and growth may be seriously affected. Moreover, a "labor shortage" at its source in agriculture may appear long before the commercialization point relevant to the application of the most efficient agricultural technology is reached.

In the longer run the problem of employment and growth in the natural resource poor economy must be sought via export substitution--i.e. the expansion of exports of industrial goods. For such a country, our two stages thesis is suggested as a guiding principle. The solution of the employment problem in the first stage requires agricultural modernization; later, when the potential gains from agricultural modernization are exhausted, industrial employment generation is likely to be tied to the promotion of labor intensive industrial or service exports.

Market Clearance in the Open Dualistic Economy

For a more rigorous treatment of the equilibrium in an open dualistic economy, let the international terms of trade be given, in diagram 8b, by the slope of  $w_a w_i$ , leading to a constant industrial wage ( $w_i$ ), as well as constant per capita consumption of agricultural goods (ou) and industrial goods (ov). When the demand curve for industrial workers ( $MPP_L$ ) is given (diagram 8d), the employment equilibrium point E leads to the population distribution point D (horizontal axis of diagram (8a)). In this case the per capita supply of food  $D_g$  is greater than the per capita demand for food ( $D_r = O_u$ ). The country is thus initially an exporter of food so that the allocation of total output of agricultural goods can be described by the following areas:

$$\begin{aligned} \text{Total agricultural output} &= \text{domestic consumption} + \text{exports} \\ (B_1 + B_2 + B_3 + B_4 + B_5) &= (B_1 + B_5) + (B_2 + B_3 + B_4) \end{aligned}$$

In the above diagram the area  $B_3$  is constructed to be of the same size as  $B_6$  (see diagram 3b above). Thus total agricultural output is distributed into a wages share ( $B_1 + B_2 + B_3$ ) and agricultural surplus ( $B_4 + B_5$ ). Notice

that  $B_1$  is consumption of food by farmers (i.e.  $ODxOu$ ) and  $B_5$  is consumption of food by the industrial labor force ( $DO'xOu$ ). Thus the wage income which is spent on industrial consumer goods is  $B_2 + B_3$  while the savings of the landlord class is  $B_4 + B_5$ .

In the industrial sector (diagram 8d), the supply of industrial goods is derived from two sources, domestic production and imports, as shown by the following areas:

Total industrial supply = domestic production + imports

$$(A_1 + 2A_2 + A_3 + A_4 + A_5) = \underline{(A_1 + A_2 + A_3 + A_4)} + (A_2 + A_5)$$

For the imported portion, notice that the exchange value of  $A_2$  is  $B_4$ , while the exchange value of  $A_5$  is  $B_2 + B_3$  ( $=B_2 + B_3$ ). Of the domestically produced industrial goods,  $A_4$  represents industrialists' profits, the rest wage income. The consumption of industrial goods by industrial workers is  $A_1 + A_2$  while that of agricultural workers is  $A_3$  (with an exchange value of  $B_2 + B_3$ ). The landlords thus come into possession of  $A_2 + A_3$  units of industrial goods which have an exchange value of  $B_4 + B_5$  (the agricultural surplus). Thus, all told, the savings of the economy add up to  $A_2 + A_3 + A_4$ . All these magnitudes ( $A_i$  and  $B_i$ ) are shown as economic flows in the attached self-explanatory national income accounting flow chart by the open dualistic economy. This chart provides the framework for most of our empirical work later on.

### Stages of Growth Thesis

Let us assume that the open dualistic economy, given the underdeveloped state of its industries, is initially an exporter of agricultural goods--food and raw materials. The country nevertheless, as we mentioned above, typically has only a limited endowment of natural resources to rely on in the long run,

so that primary exports do not have a bright future. For this reason, in the course of the process of import substituting industrialization, it may reverse its comparative advantage and ultimately switch from a position of net exporter of primary products to that of a net importer. This reversal of an LDC's comparative advantage is, of course, governed by the domestic vs. international terms of trade.

In diagram 9b, let the slope of  $w_a w$  represent the international (i.e. external) terms of trade--leading to the constant real wage  $w w'$  in the industrial sector (diagram 9d). Continuous expansion of the capital stock and consequent shifts in the demand curve for industrial labor ( $D_1, D_2, D_3 \dots$ ) then lead to equilibrium positions ( $e_1, e_2, e_3 \dots$ ) as more and more workers are gradually being absorbed into the industrial sector. In diagram 9a, we see that, associated with this labor reallocation, the comparative advantage of the country gradually changes. Before allocation has reached point K, the country is a net exporter of food (per capita exports amount to  $E_1, E_2 \dots$ ); after point K the country becomes a net importer of food (per capita imports amount to  $M_1, M_2 \dots$ ). Point K is determined by the level of per capita consumption determined by consumer demand which is consistent with the constant external terms of trade (i.e. point "q" is the consumption equilibrium point in diagram (9b)).

The development and employment generation process in an open dualistic economy may thus be compared to that in the closed economy. In the latter instance (for the case of no agricultural productivity change) the supply curve of labor is shown as SS (diagram 9d). Continuous expansion of the capital stock will then lead to equilibrium positions ( $d_1, d_2 \dots$ ) with sharply increasing real wages and a continuous worsening of the industrial

sector's terms of trade (diagram 9b). We see that for each capital stock (i.e. for each demand curve for labor), the industrial sector employs more labor in the closed economy than in the open economy before point K (i.e.  $d_1$  is "to the right" of  $e_1$ , etc.).<sup>1</sup> This is due to the fact that the existence of the opportunity to export primary goods induces the country to retain a larger labor force in agriculture. This situation reverses itself after point K (or  $e_3$  in diagram 9d) when, at each level of the industrial capital stock, the open economy employs more workers. Now the aforementioned export substitution phenomenon, permitting the sustained exportation of labor-intensive industrial goods, takes over.

In the case of the closed economy, as the industrial labor force expands, the diminished supply of food on a per capita basis consistently turns the terms of trade against the industrial sector over time. At point K, the internal terms of trade have reached the level of the external terms, and, after K, the industrial sector could begin to enjoy a comparative advantage in the world market. In the open economy case, the internal terms of trade are potentially relevant as a determinant of the direction of trade. Before K the country exports primary goods in which it has a comparative advantage. After point K, and as a consequence of labor reallocation and growth, the situation reverses itself.

### III. Statistical Implementation and Some Policy Conclusions

The above provides theoretical guidance for our research into the growth and employment problems of the open dualistic labor surplus economy. The empirical aspect of our research is centered on the post-war development of Taiwan and Korea which will be studied in conjunction with the historical

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<sup>1</sup>This assumes no differential impact on saving and the size of the capital stock itself.

development experience of Japan. In the remainder of this paper, which may be viewed as something of a progress report, we shall briefly explain the research methodology which will be employed to integrate the above theory with the empirical evidence. First, we shall summarize our theoretical conclusions in terms of observable phenomena, contrasting the cases of Taiwan and Korea. Second, we will discuss the data base required for empirical verification; finally, we shall indicate the method of verification we intend to employ.

#### Summary of Theoretical Conclusions

The employment and development problem for countries of limited natural resource endowment will ultimately have to be solved through concentration on the exportation of labor-intensive industrial goods in order to acquire both the needed agricultural and capital goods. Both Taiwan and Korea are countries of this type and, for this reason, will eventually have to engage in the type of "unbalanced growth" through trade discussed above. The more recent growth experience of these two economies must, however, be viewed as transitional towards this long run pattern.

In the course of this transition, differences between Taiwan and Korea during the past decade may be expected. Such differences may be traced to the relative state of backwardness of their agricultural sectors, namely, Taiwan inherited a much more favorable agricultural sector from the Japanese colonial period than Korea. These can be handled in the context of our theoretical framework through the postulation of differential agricultural productivity changes through time. We shall summarize only features of the theoretical analysis which are essential as a guideline for our statistical implementation.

Referring back to diagram 7a once again, let us recall the contrast in the real wage behavior of two closed economies, one, the Korean type, developing with more of an "industrial orientation," i.e. with real wages rising relatively faster and earlier. In the Taiwan type the consequences of a higher and sustained level of agricultural productivity increase were reflected in the more modest increase in real wages. In both cases, of course, we expect a rapid increase in the real wage after the turning point.

It should be noted, however (see diagram 7c) that, in the longer run, even in the Taiwan case, agricultural productivity gains, while sustained at a higher level for some time, will ultimately tend to decline. Korea's burst of agricultural productivity change may still be ahead of her--but is also likely to be followed by a decline at some future date. This is true because essentially both are natural resource poor economies with a limited potential for agricultural productivity expansion.

A consistent pattern of the movement of the internal terms of trade was shown in diagram 7b. In the case of Korea, the industrial sector's terms of trade worsened much sooner than in the case of Taiwan. In the case of Taiwan, they begin to move against the industrial sector only after agricultural productivity increase begins to decelerate (diagram 7c).

In the same diagram (7b) let the horizontal line now represent the (constant) international terms of trade. The switching points " $t_1$ " and " $t_2$ " are then shown for the case of Korea and Taiwan, respectively. At these points a country may be thought of as beginning to change from an "agricultural goods exporter" to an "industrial goods exporter" position. It enters on what we have called export substitution which eventually has to occur in labor surplus countries like Japan or U.K. (historically) and Korea or Taiwan (contemporaneously).

When a country begins to import food after the switching point ( $t_1$  or  $t_2$ ) is reached, the real wage (in terms of industrial goods) will no longer rise but stabilize. Thus, after this point, the industrial real wage path will be represented by the dotted curves (T' for Korea and T'' for Taiwan in diagram 7a).

The above indicates that a considerable number of forces are at work delimiting (or conditioning) the transitional growth process of labor surplus dualistic economies. These forces include, in addition to the demand side, (i.e. the rate at which capital accumulation and technology change proceed in the industrial sector), the extent of initial agricultural underemployment, the initial allocation of the population between the two sectors, population growth, the rate of expansion of agricultural productivity, and the international terms of trade.

Given the possible wide variation among these background factors, a large number of possible "transition patterns" can clearly be deduced. The Korea and Taiwan-type cases depicted in diagram 7 thus represent merely two special cases. Other cases can easily be generated in terms of

i) whether or not the switching point occurs before or after the commercialization or turning point, when underemployment has completely disappeared.

ii) whether or not a country is so poor in natural resources that it has to export industrial goods almost from the very beginning or simply makes the error of neglecting its agricultural sector.

iii) whether or not the export substitution point is postponed (or hastened) or the international terms of trade rise or fall (either because of Prebisch-type foreign demand problems or foreign aid, e.g. P.L. 480 import availabilities).



iv) whether or not the burst in domestic agricultural productivity comes early or late and how long it can be expected to last.

v) whether or not industrial employment expands faster than population growth and thus gradually shifts the center of gravity from the agricultural to the industrial sector.

The various relevant cases can be differentiated through the combination of different parameter values in the formal version of the above model framework.

#### Data Requirements

The data required for implementation are based on the national income accounting framework presented above depicting the open dualistic economy. For the income accounts we need output flows (agricultural and industrial) as well as the allocation of output to consumption, investment and trade for both sectors of the economy. For the stock accounts we need capital stock, population, employment, and allocation of the population among sectors. Finally, we will need information on real wages in terms of both agricultural and industrial goods, on the wage gap, and the internal and external terms of trade.

Most of the relevant information has been coded and is being collected for both countries. Based on these data, the time series for the period 1955 to the present are being graphed. Only a few series will be presented here to illustrate the methodology to be employed.

#### Methodology for Verification

The first step in empirical research is to study the characteristic of the pattern of these time series to see whether or not they conform to

the expected pattern as depicted, for example, by diagram 7a. The conformity of the time series as well as their consistency then constitute the essential intuitive stage of our analysis for purposes of identification. The full econometric implementation of these models will come as a next step.

The full verification of the model will have to await the development of a more rigorous algebraic formulation plus econometric implementation. In this formal task, our major purpose will be to (i) identify various cases, (ii) estimate the relevant parameters, (iii) project the expected time path and compare it with the actual observable path. This work is currently in progress.

The time series collected can also be used to give us some hint as to the basic soundness of our model. For example in diagram A1, we show the behavior of total exports  $E_T$  in Taiwan during the '52-67 period, as well as the underlying components, industrial exports,  $E$ , and agricultural exports  $J$ . A clear switching point can be seen around 1959 when export substitution takes hold in a decisive fashion. This confirms our theoretical notion of a switch from import substitution, fuelled by primary exports, to export substitution fuelled by labor-intensive industrial exports.

In diagram A2c, the ratios of non-agricultural productivity change (h) to agricultural productivity change (p) in Taiwan are plotted for the same period. Here we may note that another marked turning point occurs in 1961. Before 1961, agricultural productivity expands at a relatively much faster rate signifying that, in the initial phase of transition growth, the agricultural sector plays a significant and dominant role in Taiwan. After this turning point, however, the agricultural sector seems to have run out of steam as the primary source of productivity gain. In other words, once the

export substitution phase begins, the expansion of labor productivity is centered more in the industrial sector. At this point the rate of growth of GNP and of industrial employment also accelerate (see diagrams A2a and A2d).

A somewhat similar pattern, but with a five-year lag, is indicated in the Korean data, with diagram A3 representing the ratio of the two productivity growth rates.

In diagram A4, the non-agricultural real wage path for Taiwan is shown. Up to 1961, there is on the whole near constancy of the real wage. After 1961, the real wage begins to increase, first modestly (increasing at a 2.3% annual rate) then at a faster (6% after 1965) annual rate. The interpretation, based on our theory, is that the stability in the first phase was caused by the substantial gains in agricultural productivity. When agricultural productivity increase begins to slacken, real wages go up and, at the same time, the economy develops an external-orientation. Moreover, after 1965, a full employment situation is gradually reached as surplus labor becomes exhausted and the real wage rises at a much steeper rate. Once again, the industrial real wage pattern for Korea (in diagram A5) is similar, but again with a lag, i.e. the real wage first begins to rise around '65.

The above data for Korea and Taiwan seem to support the notions (i) that there exists a rough family affinity between the two open dualistic economies and (ii) that the transition process is characterized by the existence of clearly identifiable stages. We propose to examine the consistency of these and other time series and the extent of conformity of these series with our theoretical expectations as the next step in our statistical work.

Implications for Policy

This view of the employment and output problem, if fully supported by the evidence, would permit the economist to provide advice at the overall strategy level, as a developing country revises its policies in the course of transition to economic maturity. It provides a basic assessment of what are the major facets of the employment issue when seen in the framework of the overall growth problem. Based on the observed growth performance of Japan historically and Taiwan and Korea in more recent decades, such a historically dominated view should permit us to throw some light on policy issues relevant to the contemporary developing economy, with important variations depending on the typological dimensions referred to earlier, namely the structure and stage of development.

In the case of the labor surplus natural resource poor country, the broad outline of the transition into modern growth can be viewed as aiming to move from import substitution to export substitution or, in resource terms, from a land or raw material intensive to a labor intensive phase. As long as the country remains in its import substitution phase it will find it very difficult, under the best of circumstances, to really address the problem of unemployment. The policy package usually employed during its import substitution phase does not permit responsiveness of factor prices to endowments. Administered prices obtain with respect to the price of capital, the price of imports and the internal terms of trade, with industrial sector growth and relative neglect of agriculture a basic characteristic. At best, this phase may be viewed as a period of industrial entrepreneurial maturation and improvement of the agricultural infrastructure so that the economy can tackle the central problem of employment and output in the next phase. Then,

as the economy runs out of "easy" import substitution possibilities as well as its primary export-based fuel, the transition to labor intensive export substitution becomes an obvious and attractive alternative.

Government policies can, in fact, be used to ease or delay this natural evolution to and beyond the switching point. The policy package towards which the economy must move at this point will usually include establishment and maintenance of a more realistic exchange rate, higher interest rates, and adjustment of the terms of trade in favor of domestic agriculture. There is clear evidence that such an export substitution phase, accompanied and aided by such changes in the policy package, arrived in both Taiwan and Korea in the course of the 60's, early in Taiwan and a few years later in Korea.

Nevertheless, the focal point of the employment problem in any two such countries in a similar phase of development may be basically different. A crucial point here is to determine whether or not the agricultural sector has already played its historical role in terms of generating a surplus and releasing labor, as in the case of Taiwan, before the switch to export substitution occurs; or, as in the case of Korea, whether the agricultural sector has been neglected and an effort made to move directly to a labor-intensive industrial export phase. Assuming that potential reserves of agricultural productivity do exist in Korea--and most technical expertise is on the side of that hypothesis--Korea should work towards the realization of its delayed agricultural revolution and a temporary period of "agricultural orientation" which will, in fact, facilitate further later expansion of its industrial employment, output and export drive. This is due to the fact that in that situation it may no longer be necessary, as it is now, for an increasing

portion of her export proceeds to be used for the importation of food--and a larger share left over for industrial capital accumulation. In such a situation Korea may appear to follow a more balanced growth path, with some diminution of the current extreme push for industrial export substitution--and with agriculture contributing to the employment problem via the generation of double cropping and other labor intensive technology changes as agricultural modernization proceeds.

If such an agricultural upsurge is not in the offing, either because the resource endowment limitations are, in fact, more severe even in the short run, or because a continuing man-made neglect of agriculture is likely to be continued, then the industrial sector of such an economy will be saddled with a much heavier burden in terms of alleviating population and employment pressures. Labor-intensive industrial exports will have to be pushed ever harder in order to "drag" the rest of the economy along with them (even now there are signs that some of the booming export activity in Korea is being subsidized to the point where value added has become negative).

In the case of Taiwan, the evidence is quite clear that the agricultural sector has served its historical mission, has provided much of the fuel for industrial output and employment generation, and thus permitted the country to move beyond the commercialization point where the "reserve army," as augmented by population growth, has been fully absorbed into productive activity. At this point the crucial development issue in Taiwan seems to be the extent and likely rate of industrial real wage increases now that the pool of disguised and openly unemployed has become exhausted. As the real wage continues to increase beyond the turning point, the system will increasingly have to substitute skill and, ultimately, capital for labor as the basis for its comparative advantage position. The more liberal market-

oriented policies of the export substitution phase will again prove helpful at this point, in the sense of providing increased flexibility for new output and technology mixes in conformity with the changing endowment of the economy over time. Continuation of development policies which permit these changes to be transmitted via factor price adjustments and liberalized resource access can be expected to lend a system the responsiveness required for conditions of mature growth in the mixed economy--witness the Japanese case in recent decades.

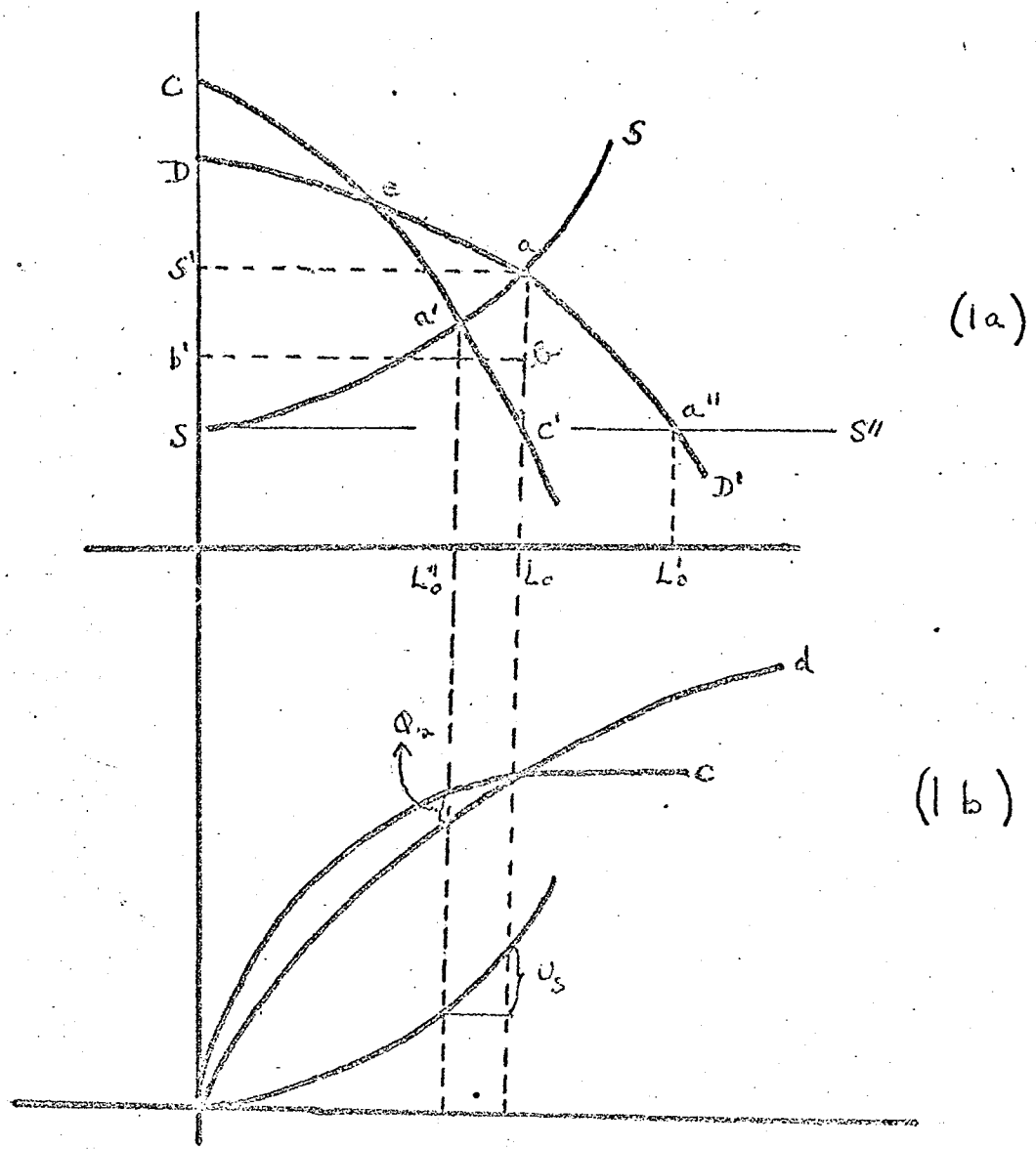


Diagram 1



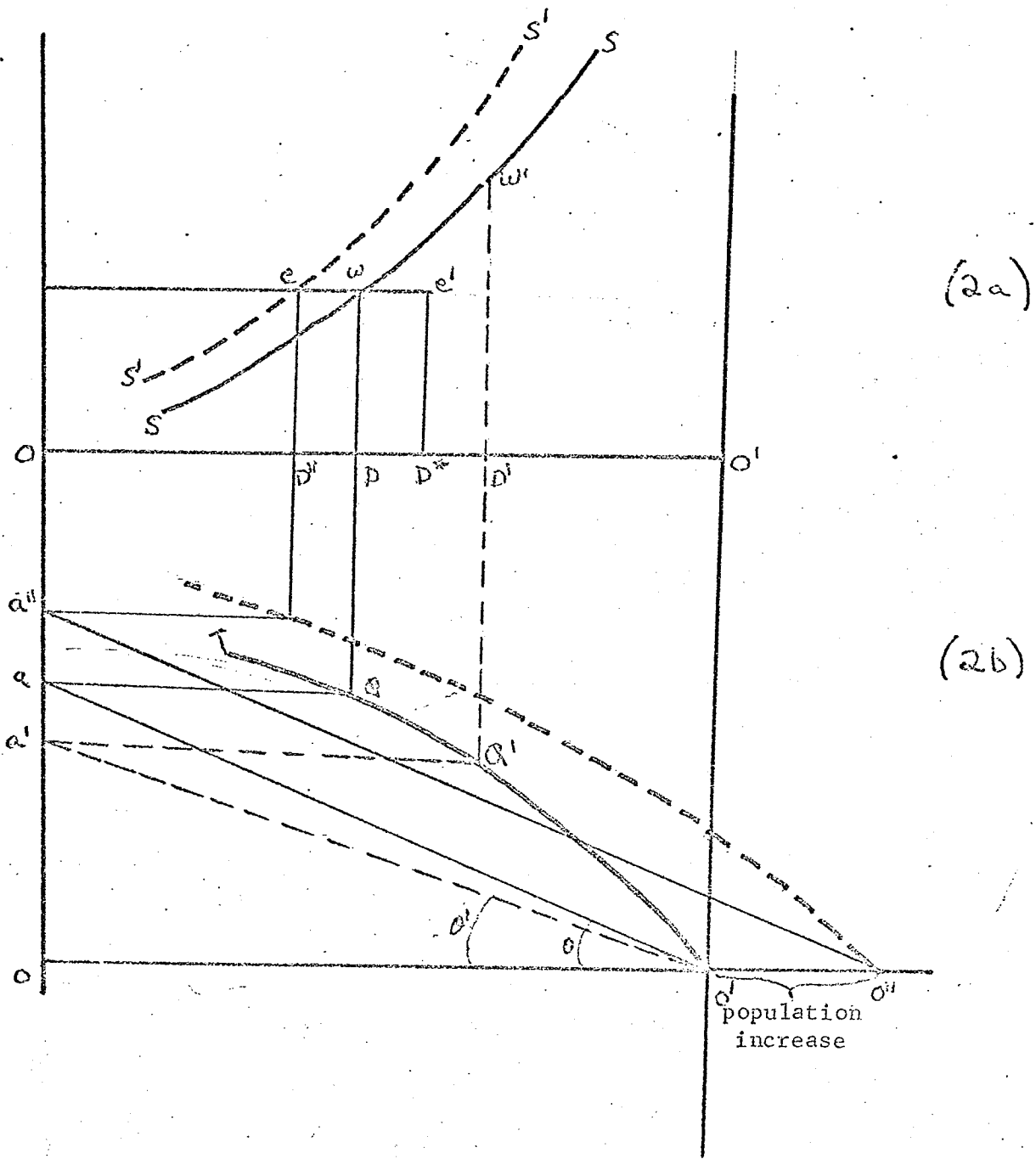
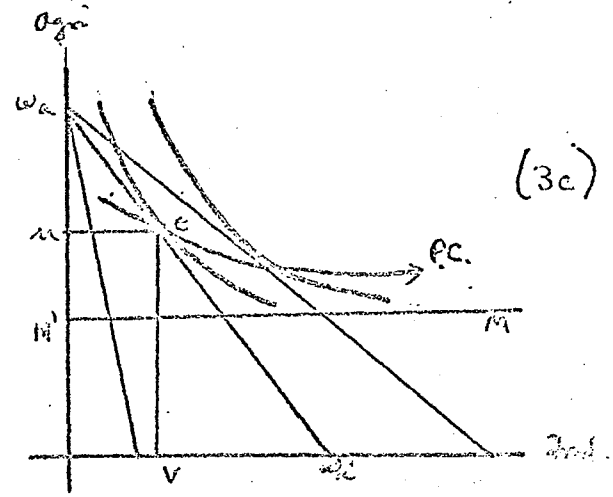
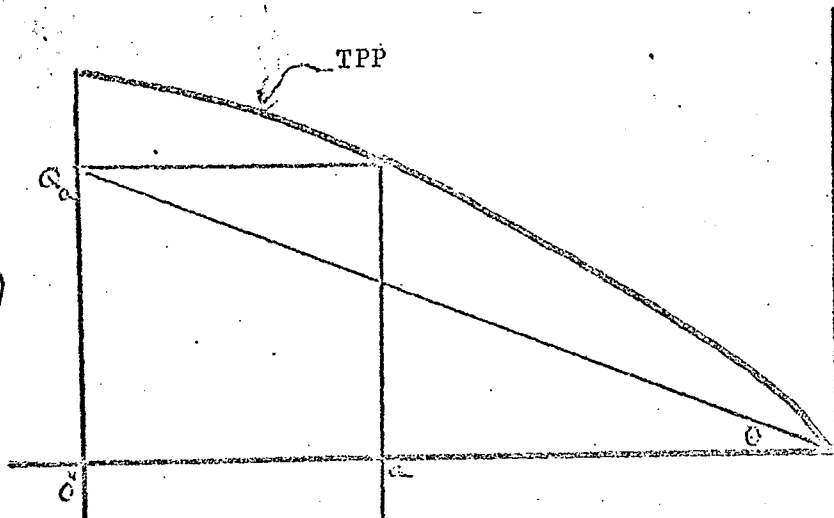
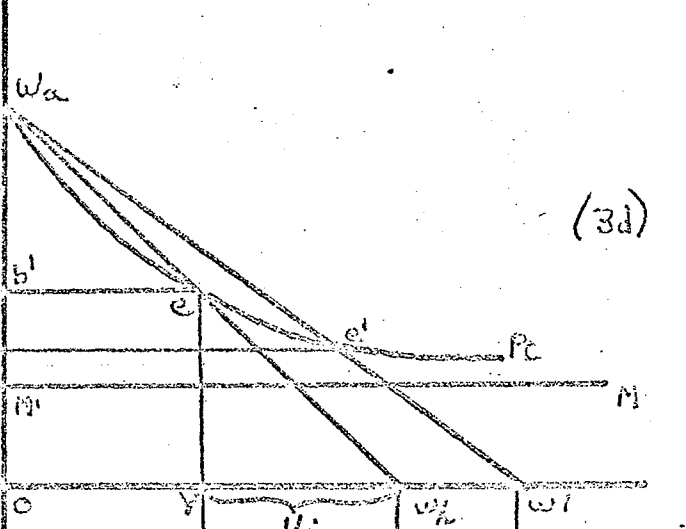
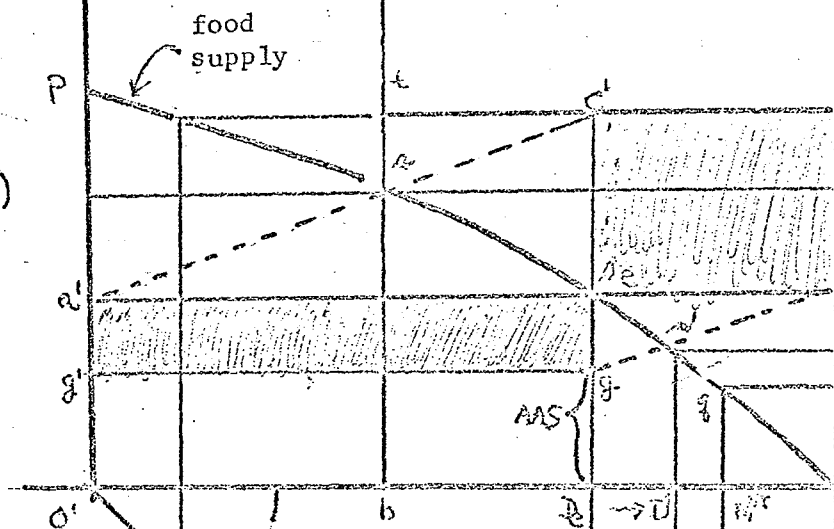


Diagram 2

(3a)



(3b)



(3e)

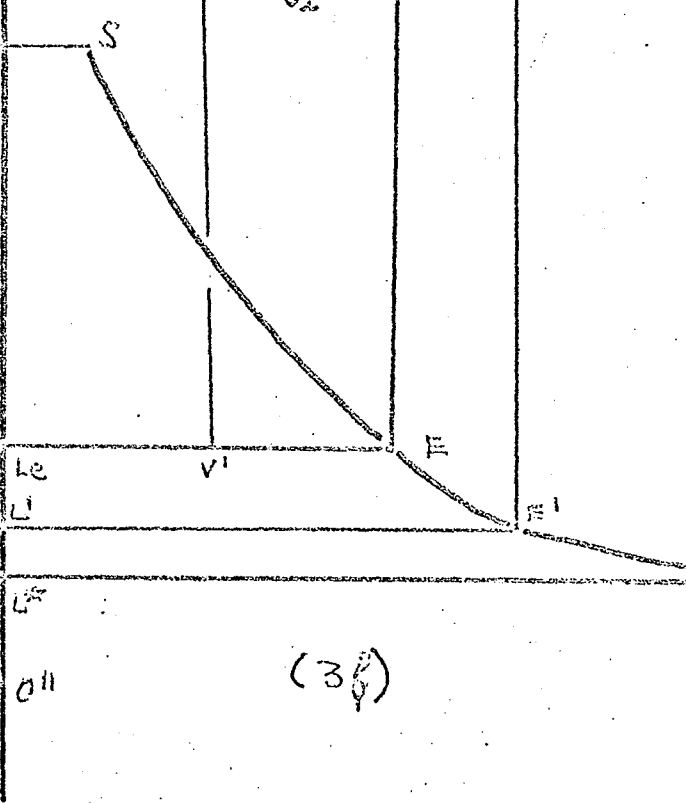
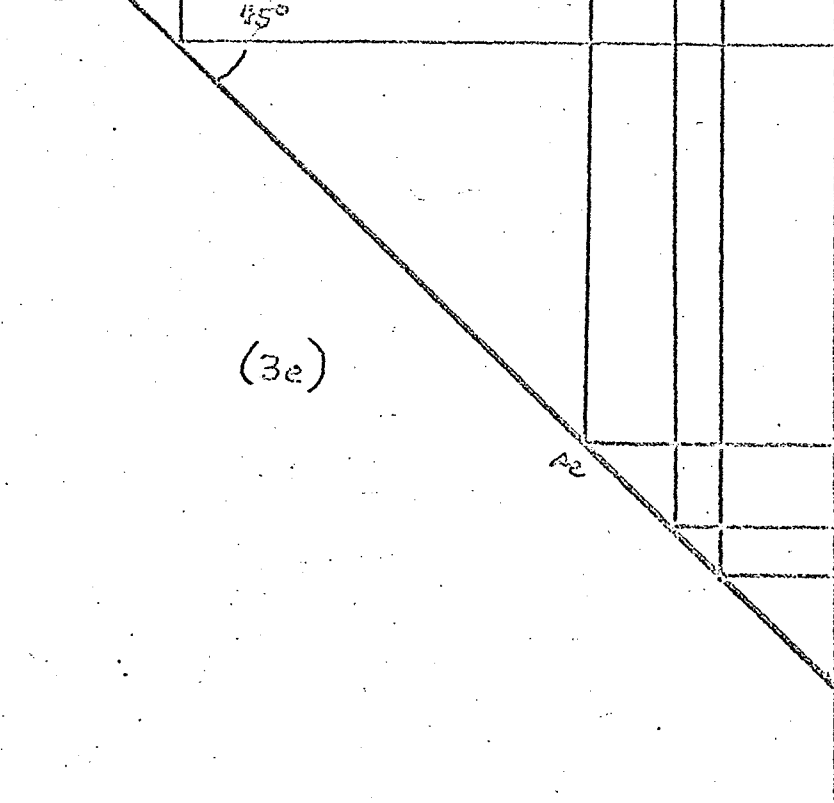


Diagram 3

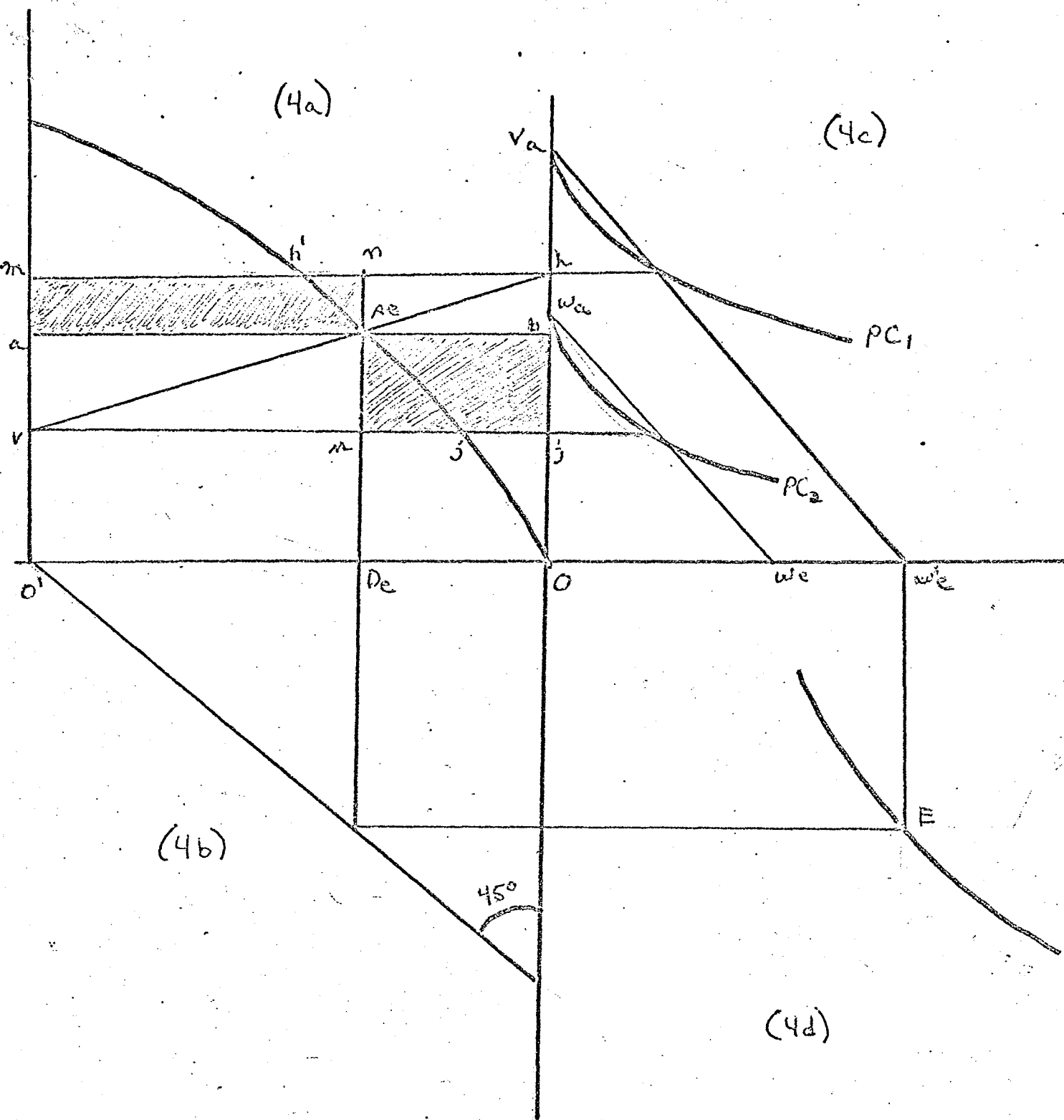
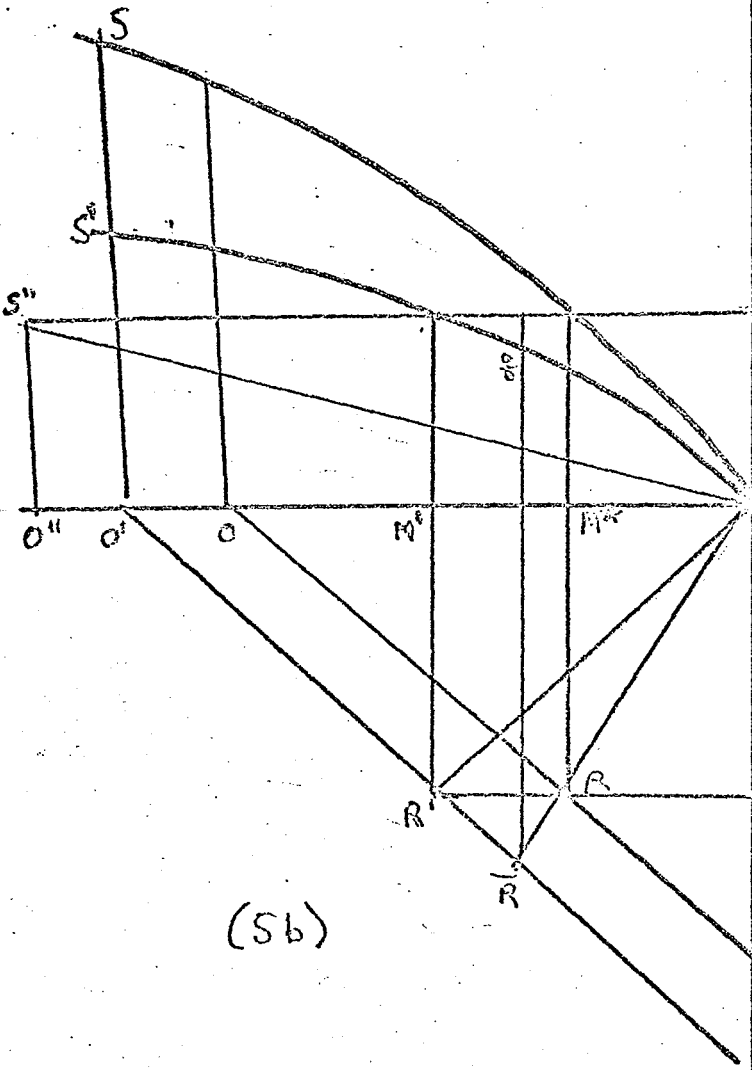
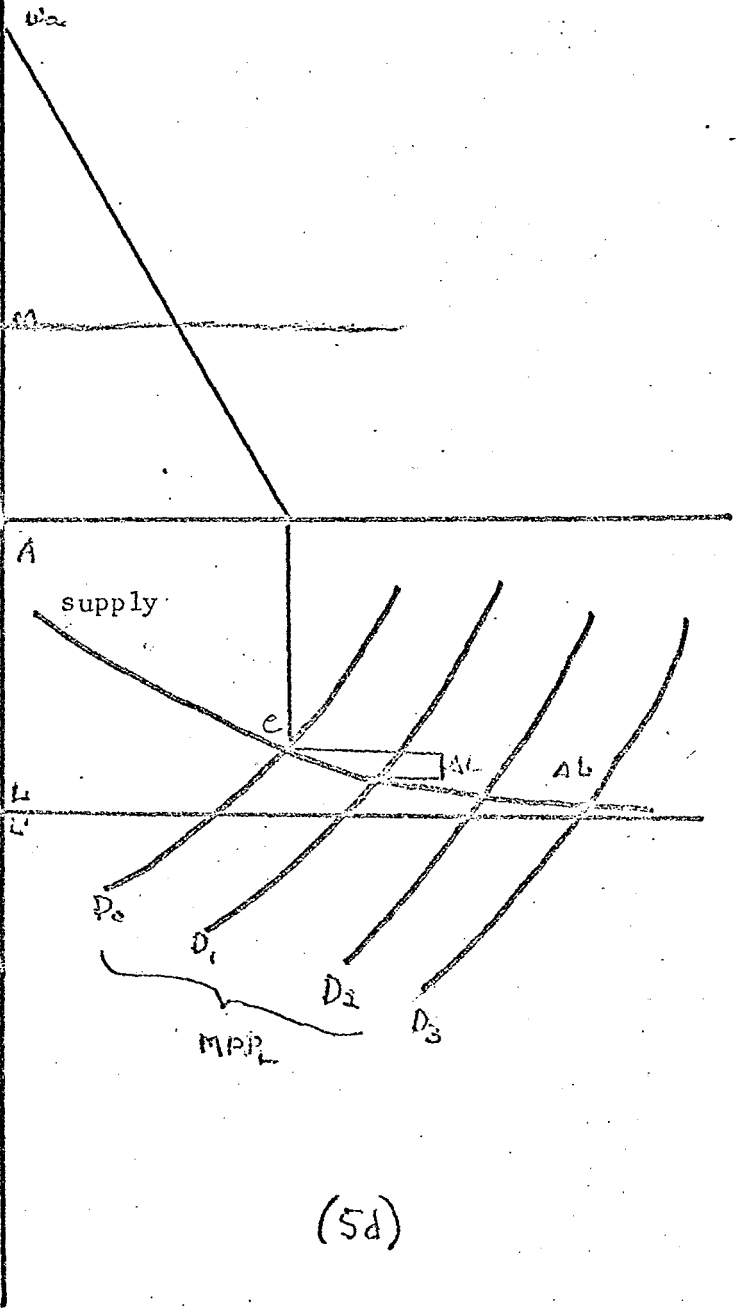


Diagram 4

(5a)



(5c)



(5b)

(5d)

Diagram 5

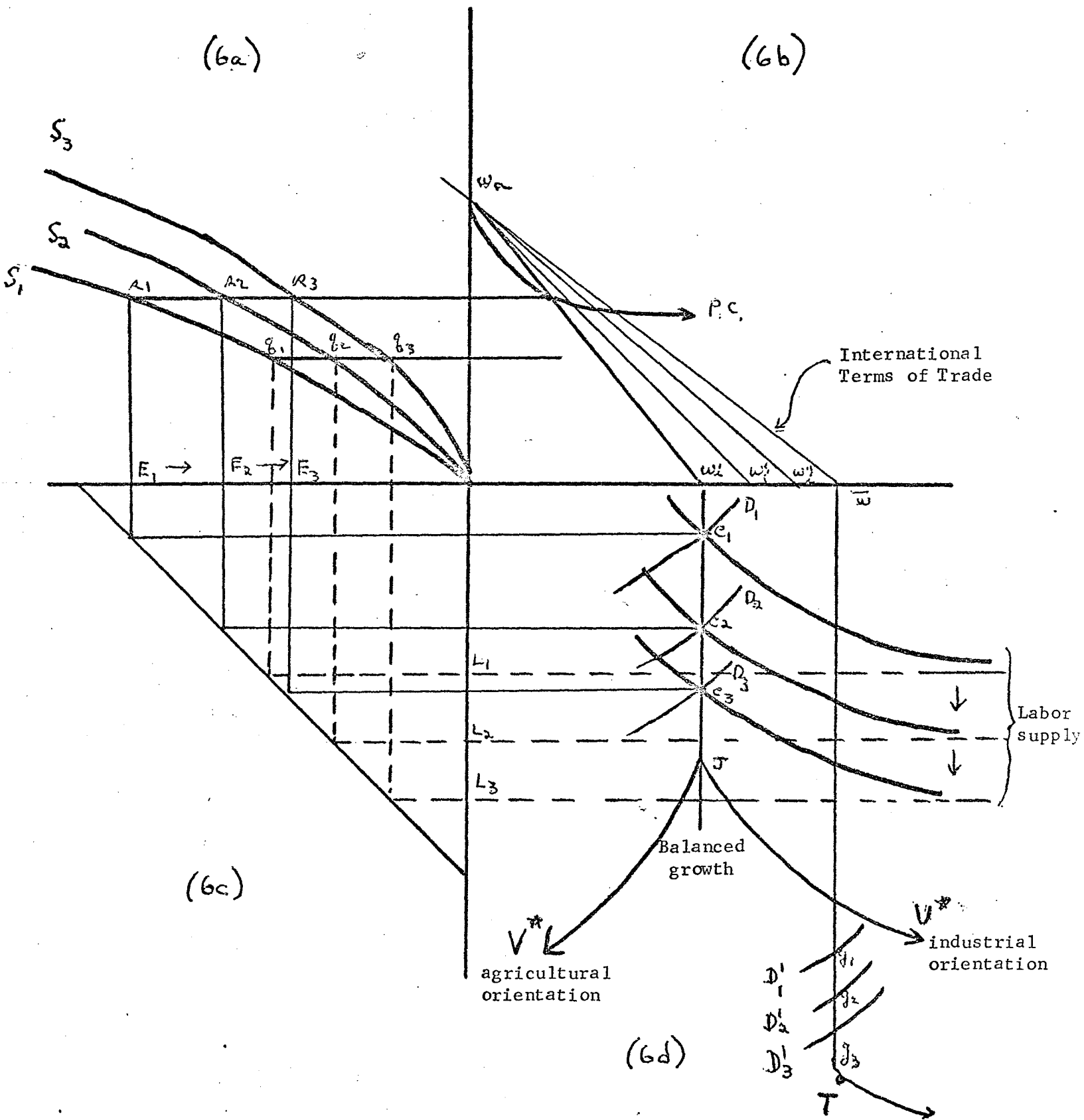
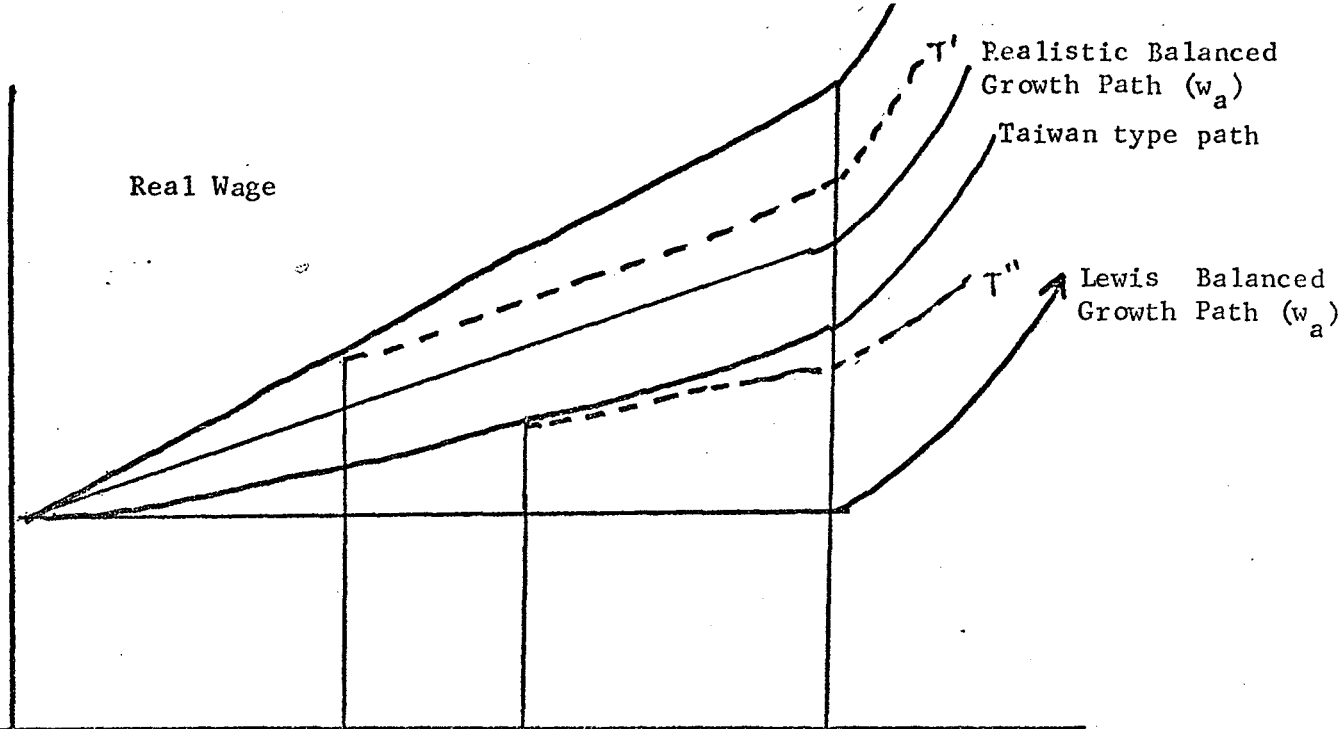
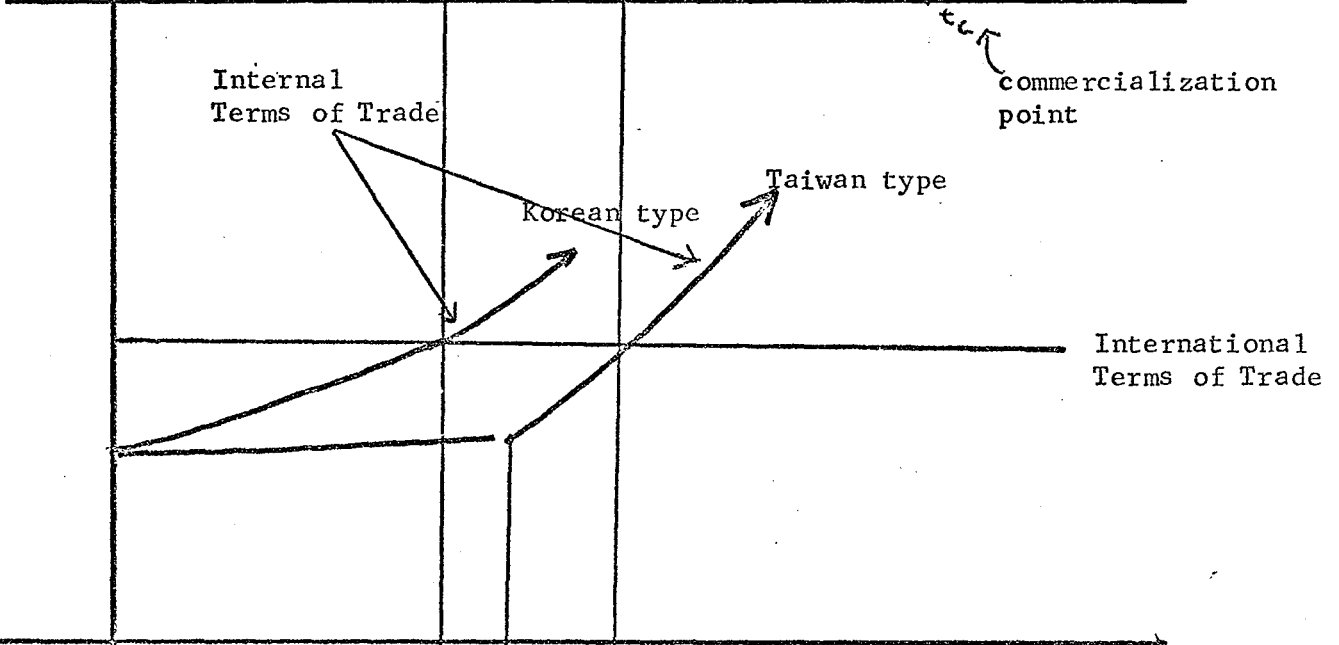


Diagram 6

(7a)



(7b)



(7c)

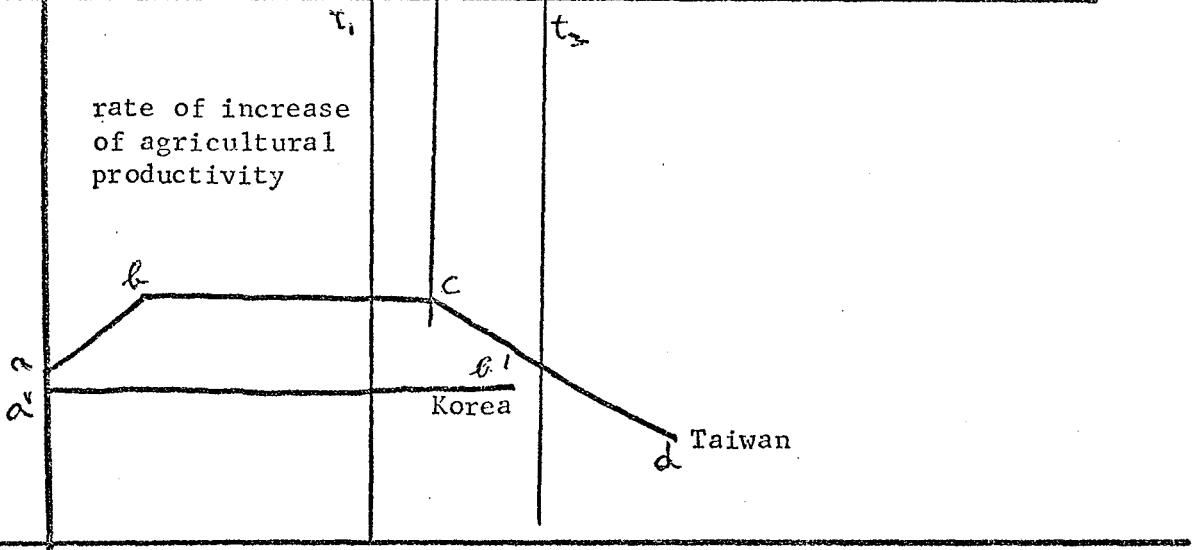


Diagram 7

(8a)

(8b)

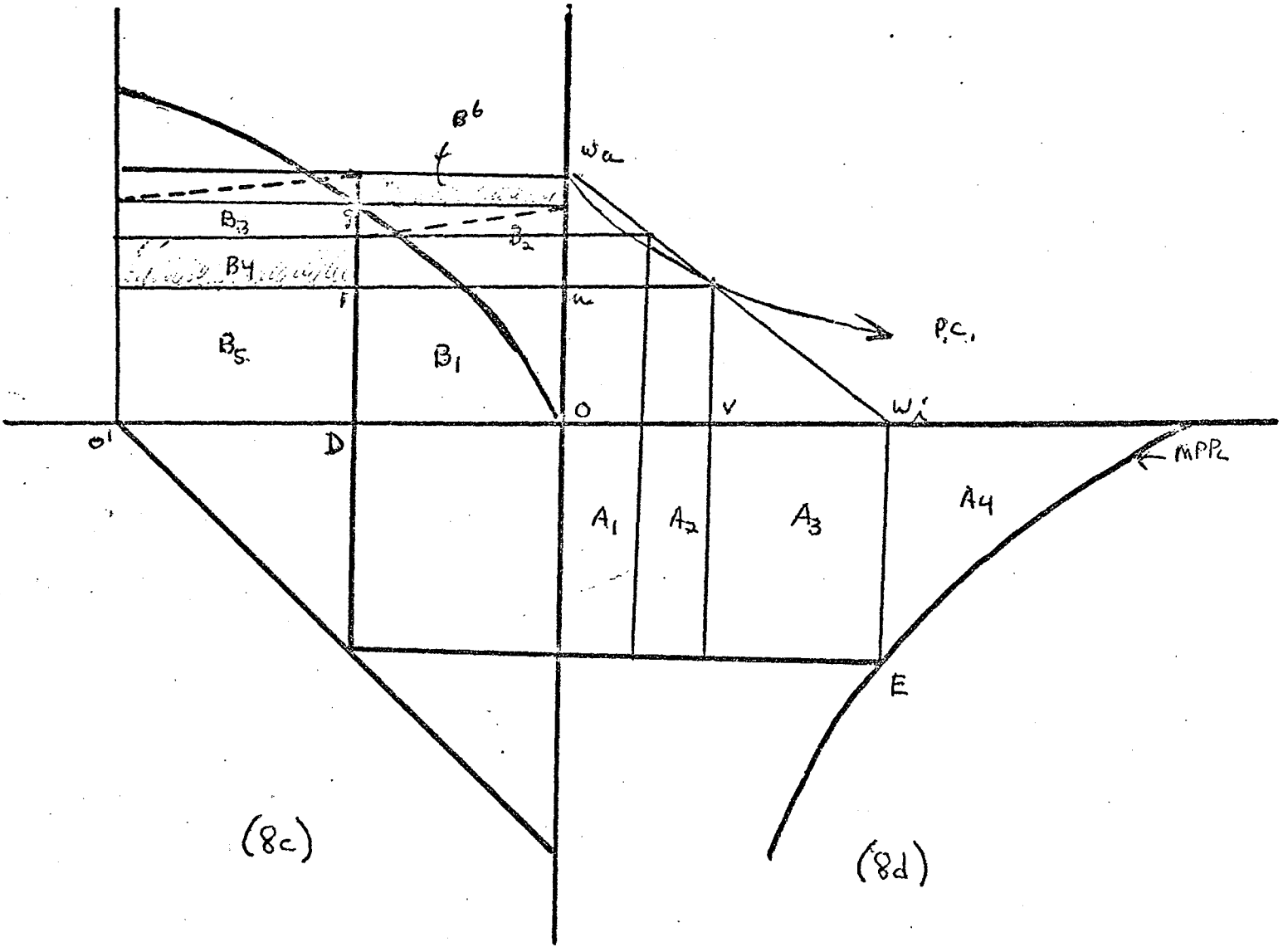
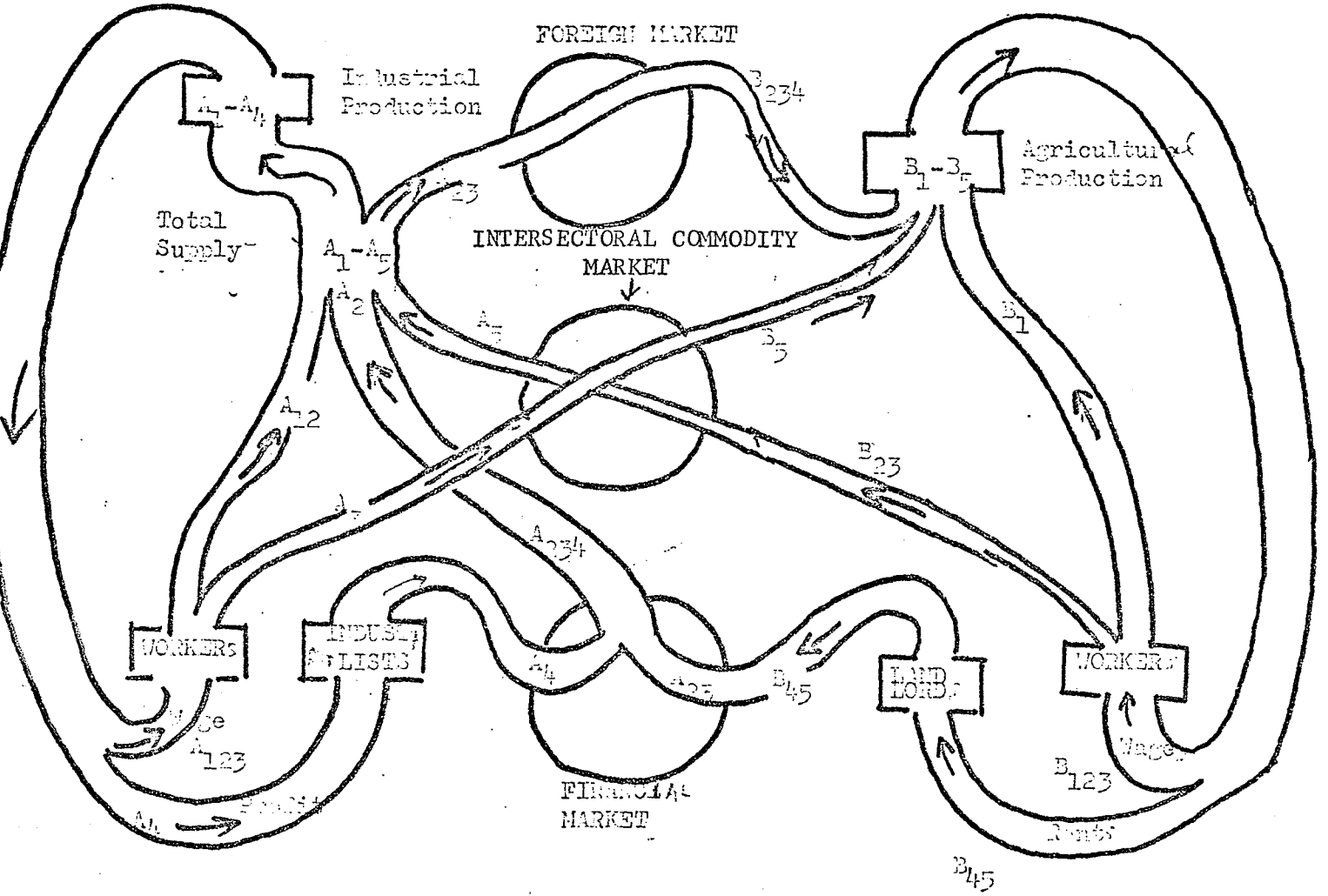


Diagram 8

INDUSTRIAL SECTOR

AGRICULTURAL SECTOR



Flow Chart



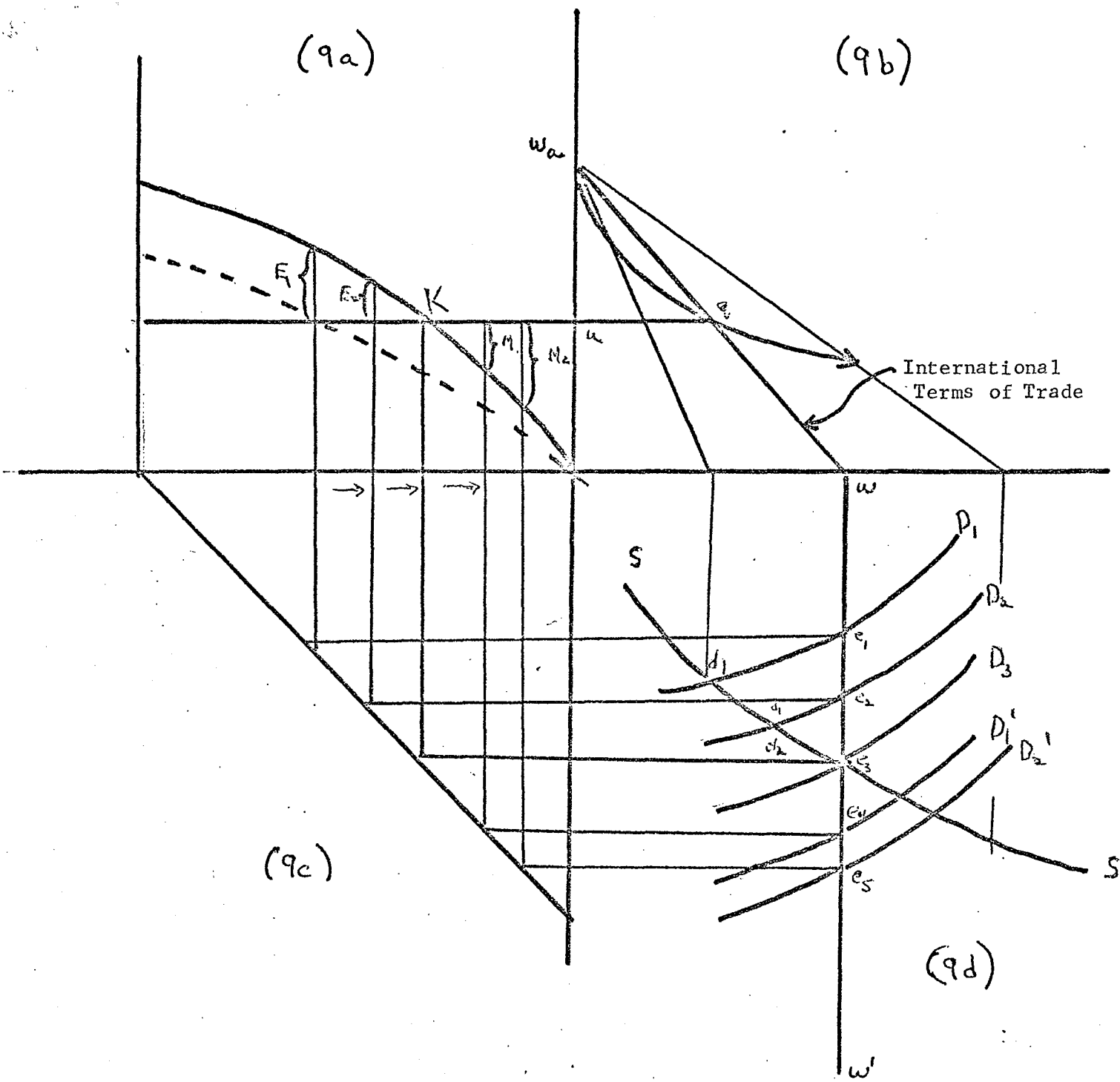
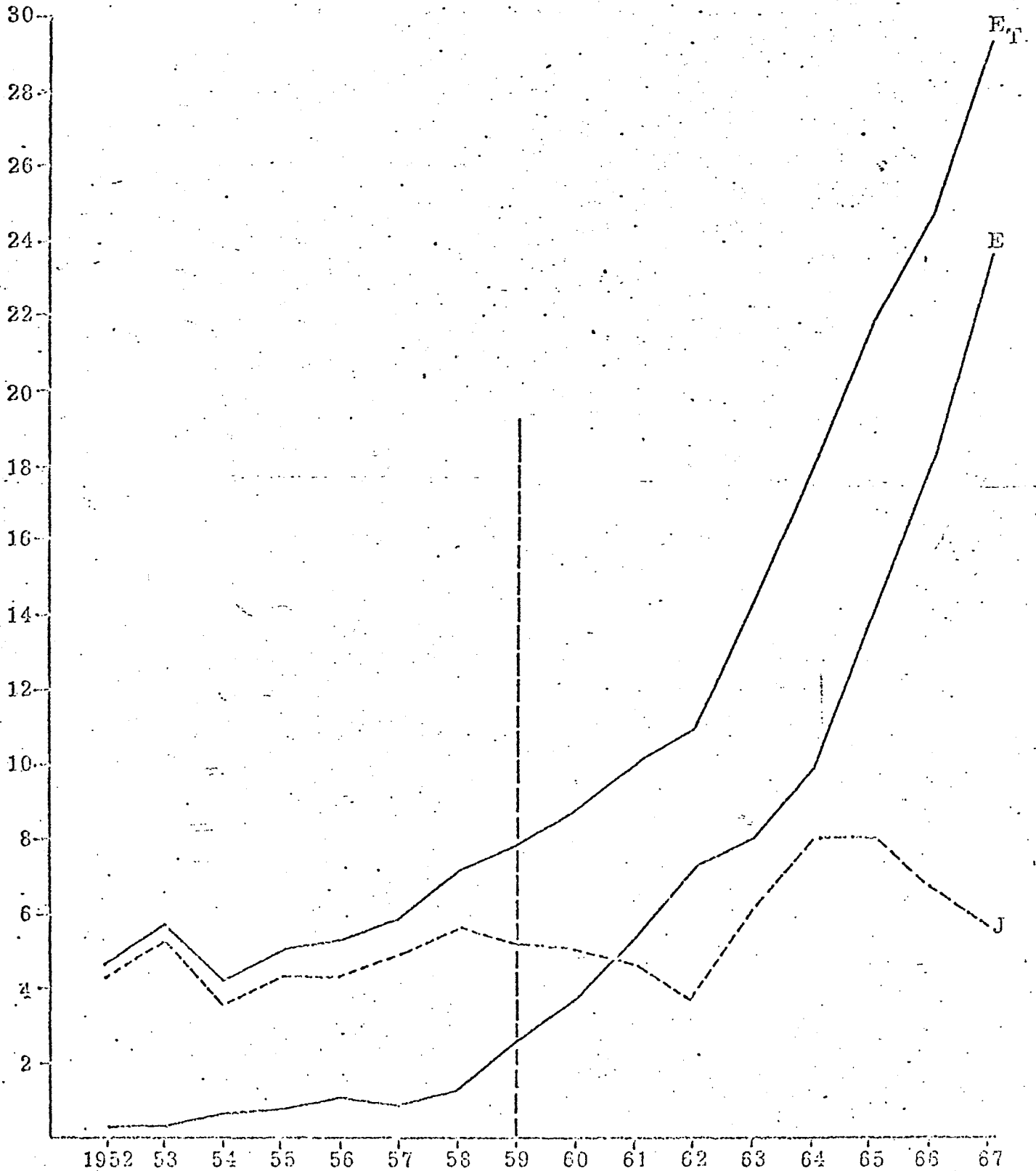


Diagram 9

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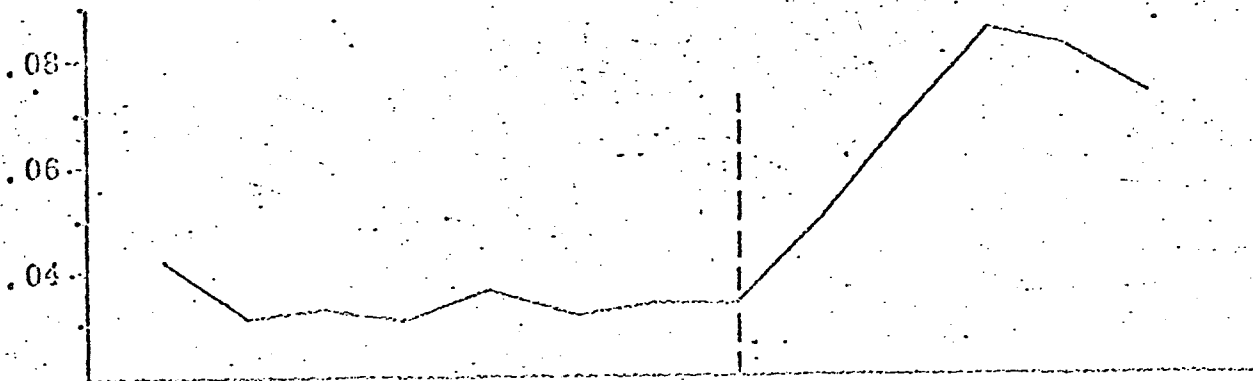
Diagram A1: Total Exports,  $E_T$ , Agricultural Exports, J, and Non-agricultural Exports, E (billion N. T. \$, constant 1964 prices)



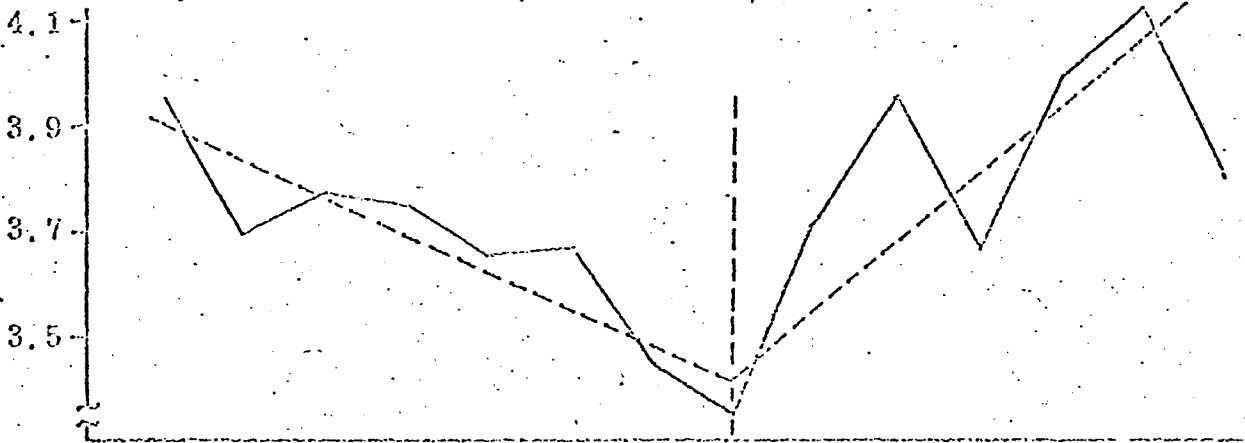
TAIWAN

Diagram A2 : Performance Variables

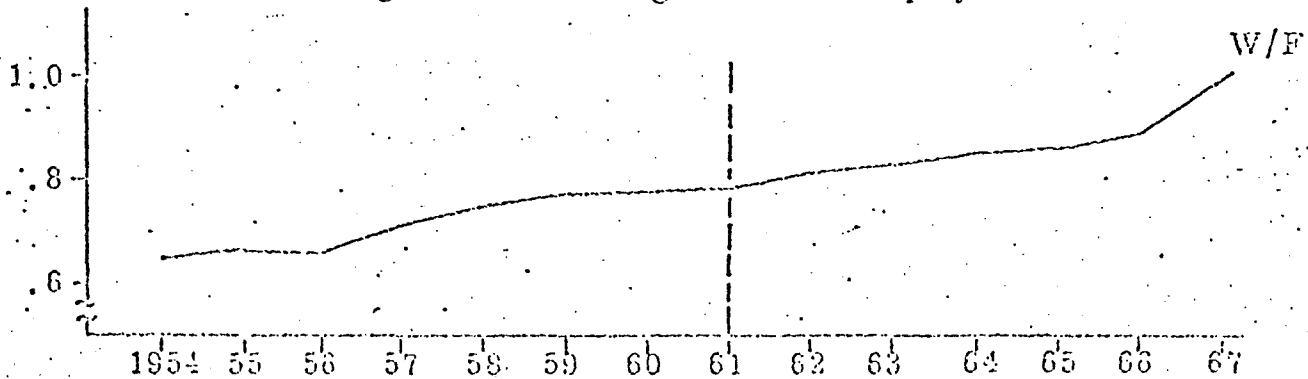
a. Per capita GDP growth rate



c. h/p

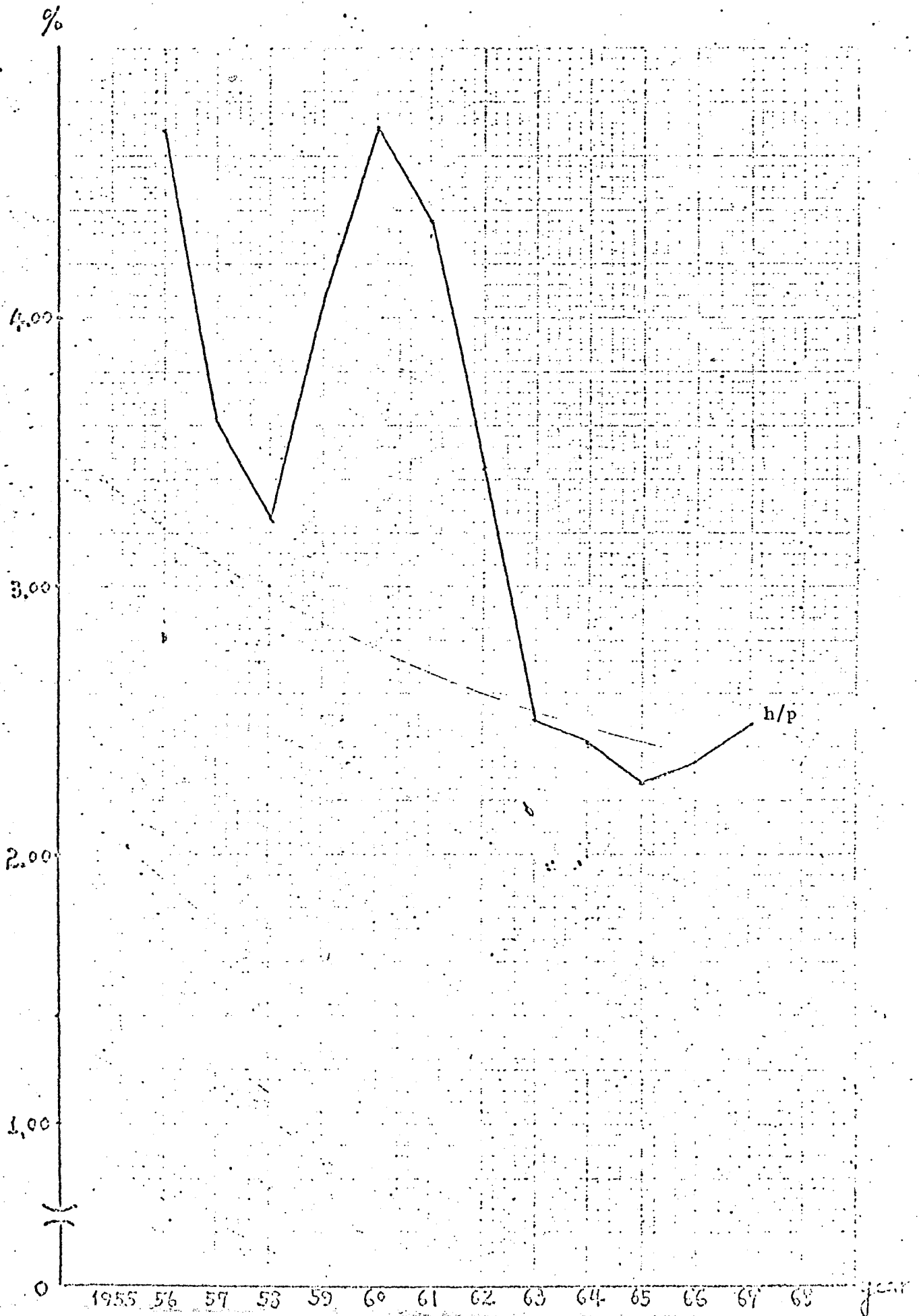


d. Ratio of non-agricultural to agricultural employment



KOREA

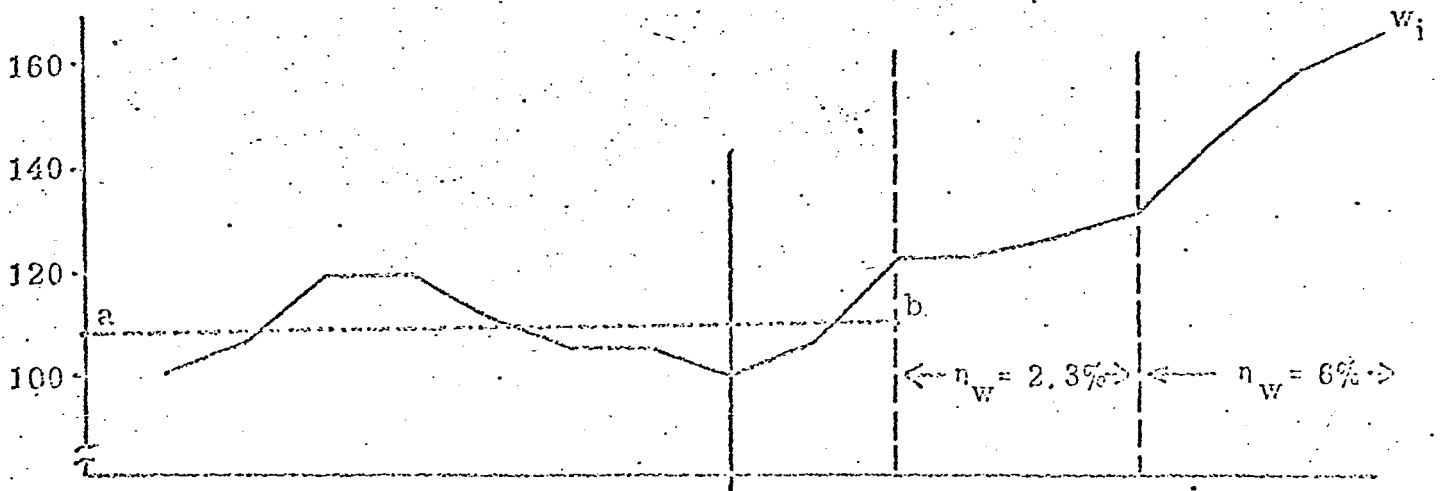
Diag. 13: Relative Productivities



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Diagram A4 : Intersectoral Relationships

a. Non-agricultural sector real wage index



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Diag. 15: Industrial Real Wage Index

