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To the Graduate Council:

I am submitting herewith a thesis written by Tsui-Hsia A. Menegay entitled "Underemployment in Agriculture: Evolution of the Concept of "Surplus Labor." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Economics.

Major Professor

We have read this thesis
and recommend its acceptance:

Accepted for the Council:

Vice Chancellor for
Graduate Studies and Research

UNDEREMPLOYMENT IN AGRICULTURE: EVOLUTION OF THE CONCEPT OF "SURPLUS LABOR"

A Thesis

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

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by

Tsui-hsia A. Menegay

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ABSTRACT

Underemployment--or surplus labor--is said to exist in many densely-populated developing countries, typically in agriculture. In this thesis, the concept of underemployment has been approached from three directions--its historical perspective, its theoretical foundations, and its empirical evidence.

The historical evolution of the concept of underemployment proceeded through three stages of development. These are the stage of initial development, the stage of theory-model building, refinement, and criticism, and the stage of reexamination. In its initial development, beginning in the 1930's, most of the writers viewed underemployment more as a problem to be solved than a kind of resource to be utilized for economic development. In the second stage, covering the 1950's and the 1960's, the development of the concept of underemployment reached its peak. The idea of using surplus labor for economic development became the main subject in the discussion of underemployment. The controversial assumption of zero marginal productivity of labor which was often identified with underemployment underwent a reconsideration during the reexamination stage. It was also argued that when labor is measured in terms of hours of work instead of number of laborers, surplus labor would coexist with a positive marginal productivity of labor under an ordinary situation.

The theoretical foundations of underemployment have been studied under three topics--definitions, marginal productivity of labor, and economic development with surplus labor. The existence

and the extent of surplus labor have been seen as largely a matter of definition in which different interpretations of the *ceteris paribus* condition were assumed. The phenomenon of underemployment has been explained in terms of the zero marginal productivity of labor and the institutional forces that sustain it. Following the discussion of the major theories of economic development that center on surplus labor, criticisms were presented.

Available major post-war empirical studies of underemployment fall into three categories. These three types are: (1) studies comparing the "efficiency norms" with actual conditions of agricultural production; (2) observations of the impact on agricultural output of the withdrawal of labor from the rural areas; and (3) studies estimating a marginal productivity of agricultural labor. These types of empirical studies were illustrated by the case studies of Rosenstein-Rodan, Schultz, and Desai-Mazumdar.

Empirically, the available evidence gives little solid support for the underemployment hypothesis. However, at this point of time, it may be more appropriate to consider this fact as suggesting a need for further development of methods of empirical studies rather than suggesting the conclusion that the concept of underemployment is invalid.

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CHAPTER I

INTRODUCTION

The concept of underemployment has evolved from the observation of the phenomenon of labor underutilization in developing countries which in turn resulted from the pressure of population growth on land.[1] While overpopulation has been an old topic, the concept of underemployment is a rather recent development. It stems from the Western concept of "disguised unemployment" as introduced by Robinson (54) in the unemployment discussion during the Great Depression. She used this term to describe workers of industrialized countries who accepted inferior occupations as a result of being laid off from their regular jobs due to the decline in effective aggregate demand. These individuals are not counted as unemployed, yet their marginal product, although not at zero value, is likely to be much lower than in periods of fuller employment. As used in western industrialized economies, the concept carries the assumption that such unemployment is of a temporary nature.

When the concept of underemployment is applied to developing countries, it refers to that vast and long-term underutilization of human resources in which more laborers than necessary for a given

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[1] Underemployment refers to the condition in which "surplus labor" exists. Surplus labor is defined as that part of the labor force which can be permanently withdrawn from a particular sector without leading to a reduction of the total output of that sector. Other synonyms of underemployment commonly seen in the literature are "disguised," "latent," and "potential" unemployment, with "disguised" unemployment being the most prevalent.

output are tied up permanently and structurally in various lines of production. This is especially so in subsistence agriculture. It is this form of underemployment with which this thesis is concerned. The concept of underemployment will be approached from three directions, i.e., the historical, the theoretical and the empirical. By surveying the literature in this field a view of the evolution of the concept of underemployment will be seen in each direction.

CHAPTER II

THE EVOLUTION OF THE CONCEPT OF UNDEREMPLOYMENT

I. Introduction

The development of the concept of underemployment as applied to the developing countries has evolved through this process: (1) initial development of the concept of underemployment; (2) theory-model building, refinement, and criticism of the concept of underemployment; (3) reexamination and redefinition of the concept of underemployment. These stages of this process will be examined in this chapter.

II. Initial Development Stage

The studies of labor utilization in developing countries during the 1930's and 1940's may be said to be the initial foundation of the development of the concept of underemployment as applied to developing countries. Statistical data presented in those studies suggested that in many less developed areas a large percentage of agricultural labor was idle for substantial periods of time. These statistical data can be seen, for example, in studies by Buck, Warriner, Rosenstein-Rodan, and Mandelbaum. In 1939 one survey-type study of Chinese land economy by Buck (3) reported that during the years 1929-1933, only 35 percent of rural male workers between 15 and 60 years of age worked for the whole year. A study by Warriner (69) in 1939 revealed that in "Eastern Europe as a whole, one-quarter to one-third of the farm population is surplus. . ." (p. 68).

A paper by Rosenstein-Rodan (56) in 1943 discussing problems of industrialization estimated that 20 to 25 million of the 100 to 110 million people in Eastern and Southeastern Europe were either wholly or partially unemployed (p. 202). In 1945 another estimation by Mandelbaum (33) showed that from 20 to 27 percent of the active rural workers in Greece, Yugoslavia, Poland, Hungary, Rumania, and Bulgaria were redundant. These earlier statistics of labor underutilization have been widely cited in later studies as support for the existence of underemployment in agriculture.

After World War II many former colonies acquired political independence and emphasized both economic development and social justice. At the same time viewpoints of labor were undergoing a change: from seeing labor as merely a means of production--a prevalent viewpoint during the colonial period--to considering the promotion of labor's productivity and income level. In fact, full employment has become one of the main objectives in the course of economic planning for almost all the developing countries.[1] The phenomenon of labor underutilization thus received a great deal of attention by both policy-makers and economists. In fact, the U.N. report, "Measures for Economic Development of Underdeveloped Countries" (66), written by a group of experts including W. A. Lewis, T. W. Schultz, and D. R. Gadigil in 1951, cited all the above studies and added that it seems "safe to assume that for many regions of India and Pakistan, and for

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[1]Statements regarding full employment made in official documents relating to economic planning can be found in these documents: India, Government of, Planning Commission, *First Five Year Plan: A Draft Outline*, New Delhi, 1951, p. 19; Ceylon, Government of, National

certain parts of the Philippines and Indonesia, the surplus cannot be less than the pre-war average for the East European Region" (p. 9).

In this report (66) the first definition of underemployment or disguised underemployment was put forward. The experts wrote, "The disguised unemployed are those persons who work on their own account and who are so numerous, relatively to resources with which they work, that if a number of them were withdrawn for work in other sectors of the economy, the total output of the sector from which they were withdrawn would not be diminished even though no significant reorganization occurred in this sector, and no significant substitution of capital" (p. 7). With an emphasis on the agricultural sector the definition of underemployment was repeated later in the report: "In many under-developed areas, the population of the land is so great that large numbers could be withdrawn from agriculture without any fall in agricultural output and with very little change of capital techniques" (p. 41). Their definition of underemployment implied zero marginal productivity of agricultural labor and assumed the condition of *ceteris paribus*.[2] This way of defining underemployment

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Planning Council, *The Five Year Plan*, Colombo, Ceylon, 1959, p. 86; Philippines, Government of, National Economic Council, *The Five Year Economic and Social Development Program for FY 1957-1961*, Manila, January, 1957, mimeographed, p. 39; and Indonesia, Government of, State Planning Bureau, *Broad Outlines of Five-Year Development Plan 1956-1960*, Djakarta, 1958, mimeographed, p. 143.

[2]By the condition of *ceteris paribus* it is meant that in the course of the withdrawal of labor from a certain sector, the only changing factor is the number of laborers, everything else, such as organization of work, production methods, capital investment, institutional framework, etc., is kept constant.

has been adopted by many economists, proponents as well as opponents of this concept.

Navarrete and Navarrete (42) in a paper of 1951 stated that the problem of underemployment has existed in most developing countries and the cause of the problem is due to the insufficiencies of the complementary means of production and not because of the laco of effective demand. Their definition of underemployment is, "If we take the size of the labor force as given, underemployment may be described as a situation in which the withdrawal of a certain quantity of the factor labor to other uses will not appreciably diminish the total output of the sector from which it is withdrawn. This is as much as to say that the marginal productivity of these units of factor labor in their original employment is zero, or very close to zero" (p. 341). While accepting zero marginal productivity of labor in their definition, they relaxed the *ceteris paribus* condition assumed by the U.N. experts and included the introduction of some capital into the production function.

Writing in 1952, Hsieh (17) discussed underemployment in Asia. He made distinctions among three forms of underemployment in agriculture, i.e., visible, disguised and potential underemployment. In visible underemployment, there are two components, i.e., seasonal and chronic underemployment, the latter persisting in periods of peak agricultural activity. These three forms of underemployment have some policy-making implications. According to Hsieh, "The three different forms of underemployment--visible, disguised and potential--present, in fact, three different stages in which labor may be released from a given economic sector without reducing output--(a) no change in method

of production; (b) simple changes in methods of production without capital investment; (c) more fundamental changes in methods of production requiring substantial capital investment" (p. 725). Although stating that the existence and extent of underemployment are a matter to be examined empirically, Hsieh believed there existed a considerable amount of underemployment in most of the Asian nations.

Up to this point, wide-spread underemployment has been viewed more as a problem than as a resource for economic development. This can be seen in the literature which has been introduced in this section. For example, in the U.N. report, we find the statement: "Rapid economic development is also the fundamental remedy for disguised unemployment" (p. 7). In the summary of their paper, Navarrete and Navarrete were attempting to present an effective remedy for disguised unemployment.[3] In the article written by Hsieh, we find that the emphasis was on "solving the problem of underemployment."[4]

III. Theory-Model Building, Refinement, and Criticism Stages

Theory-Model Building

The idea of using surplus labor as a means for industrialization was first seen in the article, "Problems of Industrialization of

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[3]"Summing up, the most effective remedy for underemployment is a policy which combines an adequate rate of well-balanced investment with a moderate rise in prices, at a level of full productive employment, growing national output and rising real per capita income" (p. 347).

[4]". . . while it is generally recognized that the remedy for underemployment lies in the economic development, careful thought needs to be given to the difficult problems involved in formulating concrete economic development plans that will reconcile the objective of employment creation with other social and economic objectives" (p. 704).

Eastern and Southeastern Europe" by Rosenstein-Rodan (56) in 1943. Assuming that "there exists an 'agrarian excess population' in Eastern and Southeastern Europe amounting to 20-25 million people out of the total population of 100-110 million, i.e., that about 25 percent of the population is either totally or partially ('disguised unemployment') underemployed" (p. 245). He suggested that "The first task of industrialization is to provide for training and 'skilling' of labor which is to transform Eastern European peasants into full-time or part time industrial workers" (p. 248). Subsequently in 1945, Mandelbaum (33) presented a "mechanical" model of planned industrialization to absorb the surplus labor.

Rosenstein-Rodan's and Mandelbaum's idea of using surplus labor for industrialization was adopted and expanded in the book, *Problems of Capital Formation in Underdeveloped Countries*, written by Ragner Nurkse (44) in 1953. Nurkse argued that chronic and large-scale underemployment existed widely in "the densely populated peasant economies that stretch all the way from South-Eastern Europe to South-Eastern Asia" (p. 32) and surplus labor with zero marginal productivity in agriculture can be removed from the farm and "work on capital projects--irrigation, drainage, roads, railways, houses, factories, training schemes and so on" (p. 36). Food consumption required by the project workers can be supplied from the subsistence agricultural sector by the remaining farm labor. According to this theory of underemployment, agricultural output will not fall if some kind of reorganization such as consolidation of strips and scattered plots took place; consumption need not be less than before; and the value of material

capital will be increased. Since, for Nurkse, capital formation is the key for economic development, underemployment is a concealed resource available for economic development.

The publication of Lewis's well-known article, "Economic Development with Unlimited Supplies of Labor" (29) in 1954 has brought the development of the concept of underemployment to a new era. Writing in the classical tradition, Lewis analyzed how economic development in a surplus labor economy can be accomplished through the utilization of this surplus labor. In his two sector model, an economy is composed of a "subsistence" sector where there exists surplus labor and a "capitalist" sector where there exists no surplus labor. A fundamental relationship between the two sectors is that when the capitalist sector expands, it draws upon labor from the subsistence sector. The supply of unskilled labor in poor, densely populated countries is assumed to be unlimited as long as supply exceeds demand at a given wage level. The unlimited supply of unskilled labor enables new industries to be created or old industries to expand in the capitalist sector at a low and constant wage rate. The expansion of the capitalist sector will continue until the pool of surplus labor is exhausted.

Refinement

It seems now that overpopulation, instead of being a curse, is truly a blessing, since it can provide cheap labor for the acceleration of economic development. The concept of underemployment and the theory of development with surplus labor have received, more than ever,

extensive discussion and exploration with various emphases. Some writers, such as Eckaus (8) in 1955, Leibenstein (27) in 1957, Mazumdar (34) in 1959, and Wonnacott (73) in 1961 attempted to provide theoretical explanations of the existence of underemployment. Others, such as Ranis and Fei (49) in 1961, Jorgenson (20) in 1961, Enke (9) in 1962, and Georgescu-Roegen (11) in 1963 devoted their efforts to analyzing how to utilize surplus labor in the course of economic development. Another group of writers, such as Mellor and Stevens (37) in 1956, Rosenstein-Rodan (56) in 1957, Dovring (7) in 1967, and Desai and Mazumdar (6) in 1970, sought empirical evidence to prove the hypothesis of underemployment. Various aspects of these writers' arguments will be discussed in more detail in the later chapters.

Criticisms

While the concept of underemployment and the theory of development with surplus labor have been viewed by some as an adequate theory and a powerful tool in explaining the process of economic development in densely populated developing countries, an important part of the economic profession has remained skeptical and critical. The Egyptian economist Koestner (26) in an article written in 1953 was among the first to criticize the concept of underemployment when he strongly criticized Nurkse's (44) theory of capital formation with surplus labor. Warriner (71) in 1955 reversed her earlier position in *Land and Poverty in the Middle East* (70) (which showed that 50 percent of the Egyptian rural population was surplus) by noting that she had omitted the labor requirement for capital maintenance in agriculture

(p. 26). While Schultz (59) in a paper of 1956 cited examples in Latin American countries where the removal of agricultural labor resulted in a decline in agricultural output, he argued on a broader base and wrote, "I know of no evidence for any poor country anywhere that would even suggest that a transfer of some small fraction, say 5 percent, of the existing labor force out of agriculture, with other things equal, could be made without reducing its [agricultural] production" (p. 375). Writing in 1957, Viner (68) strongly criticized the proposition proposed by some writers, such as Eckaus, that underemployment could exist in agriculture because of limited technical substitutability of factors of production. Viner maintained that "As far as agriculture is concerned, I find it impossible to conceive of a farm of any kind which, other factors of production being held constant in quantity and even in form as well, it would not be possible, by known methods, to obtain some addition to the crop by using additional labor in more careful selection and planting of the seed, more intensive weeding, thinning and mulching, more painstaking harvesting, gleaning and cleaning of the crop" (p. 152). In an unpublished dissertation in 1957, Kenadjian (24) reviewed a wide range of studies of underemployment and concluded ". . . that almost invariably the estimates of surplus labor have been inflated and the opinions about the extent of redundance in a particular country have contained elements of gross exaggeration in all the countries about which quantitative information can be found to any significant extent. In particular, assertions that disguised unemployment exists in proportions as high as 25 to 30 percent of the labor force in any sector of the economy of even the

most overpopulated countries of the world appear to be entirely without foundation" (p. 259). Contending that the assumption of *ceteris paribus* is unrealistic, Haberler (13) wrote, "The case where after removal of a part of the labor force output remains unchanged (or even rises) without capital having been increased, technology improved, social habits changed, etc., or where such change can be expected to be the automatic and immediate consequence of a prior reduction in labor input, must be comparatively rare and inconsequential compared with the increase in output due to the gradual introduction of all those changes and improvements" (p. 151). In the recent book, *Asian Drama*, Myrdal (41) examined various aspects of the concept of underemployment and commented that the concept of underemployment is a useless construct (p. 2058).

Objections to the concept of underemployment also come strongly from many empirical studies. In 1962 Pepelasis and Yotopoulos's study (48) showed the nonexistence of underemployment in Greek agriculture since 1954 where removable surplus labor was defined as the amount of labor which could be removed for at least one year without any change in quantities of other factors of production and without leading to any reduction in output (p. 86). Schultz's study (61) in India led him to the conclusion that ". . . a part of the labor working in agriculture in poor countries has a marginal productivity of zero . . . is a false doctrine" (p. 70). Paglin (47) studied the data in the *Farm Management Studies* of India and he asserted that ". . . there is no significant surplus of labor for Indian agriculture as a whole" (p. 816), and ". . . the common assumption that economic development

will produce a large exodus of labor from agriculture is shown to be in need of drastic revision" (p. 816). In his article of 1967, "Industrial Growth, Agricultural Underemployment and the Lewis's Model--The Egyptian Case, 1937-65," Mabro (32) empirically examined Lewis's model and Egypt's economic development and concluded that ". . . the result is negative as far as employment is concerned" (p. 346). Recently Hansen (14) claimed that underemployment did not exist in rural Egypt on the basis of his empirical study of employment and wages in Egypt.

IV. Reexamination Stage

The importance of zero marginal productivity of labor--an assumption which has been identified with the existence of surplus labor--has become a moot point since Sen (63) presented his arguments in "Peasants, Dualism with or without Surplus Labor" in 1966. In this article Sen showed that the existence of surplus labor which constitutes underemployment does not require the marginal productivity of labor to be zero; it requires only that the schedule of marginal disutility from work and marginal utility from income be flat in the relevant region. Zero marginal productivity of labor is neither a necessary nor a sufficient condition for the existence of surplus labor. This will be discussed in detail in Chapter III. Taking the same line as Sen, Willisz (72) in "Dual Economies, Disguised Unemployment and the Unlimited Supply of Labor" (1968) investigated some fundamental assumptions of the "structural" version of under-employment. He wrote, "Under the assumption of maintenance of ties

between the rural and urban family members, the zero (or negligible) rural marginal product issue, crucial to the structural hypothesis, loses much of its interest. Even if the rural marginal product is zero, labor misallocation need not occur. Moreover, zero marginal rural product does not result in an infinitively elastic supply of labor to urban jobs" (p. 24), and pointed out that there is a need for an alternative explanation of urban unemployment in dual economy countries.

Our discussion of the historical evolution of the concept of underemployment has been considered in terms of three stages. The discussion in the following chapters will be turned from a vertical to a horizontal investigation.

CHAPTER III

THE THEORETICAL ASPECTS OF UNDEREMPLOYMENT

The concept of underemployment has been considered a "static" theory by various writers, such as Myrdal (41), because of the assumption that the only changing variable is the number of laborers with everything else remaining constant. However, the opinions of the writers vary regarding the degree of strictness or number of restrictions necessary for a "static" approach to this concept. Therefore, some of these different opinions will be discussed in terms of static and semi-dynamic concepts of underemployment. Section I consists of the distinction between these two terms. In section II we will study various aspects of the marginal productivity of labor and its relation to surplus labor. In section III we will present three main contributors'--Nurkse, Lewis, and Ranis and Fei--theories of economic development through their use of surplus labor.

I. Definitions: The Static and Semi-Dynamic Concepts of Underemployment

Underemployment is said to exist under the condition whereby the removal of a part of the agricultural labor force will not decrease the prevailing agricultural output. In other words, underemployment is said to exist where there is surplus labor. This simple, unqualified way of defining underemployment appears in some writings,[1]

[1]For example, Mukherjee (40) in *Economic Surveys in Under-Developed Countries, A Study in Methodology* wrote: "By structural under-employment we mean that the total agricultural production will not fall even if a particular number of agricultural workers are taken away from it and given employment elsewhere in the economy" (p. 89).

however, one or both of the following assumptions are usually added. One is the *ceteris paribus* condition and the other is zero marginal productivity of labor. The former assumption will be discussed in this section and the discussion of zero marginal productivity of labor will be taken up in the next section.

The assumption of the *ceteris paribus* condition means that in the course of withdrawing labor from the agricultural sector, the only changing factor is the number of laborers with everything else, such as organization of work, production methods, capital investment and institutional framework (e.g., tenure system, inheritance system, etc.) kept constant. The purpose of adding this assumption is to identify the existence and to measure the extent of underemployment.[2] Rosenstein-Rodan (57) referred to the definition of underemployment with the strict *ceteris paribus* condition as a "static" concept of underemployment. Considering the static concept of underemployment to be ". . . the basic concept, which has clear and unequivocal meaning" (p. 1), he defined it as "that amount of population in agriculture which can be removed from it without any reduction in output" (p. 1).

Obviously, the more the *ceteris paribus* condition is relaxed the larger the amount of surplus labor which can be removed. This point is made clear by Hsieh's (17) discussion of "disguised" and "potential" underemployment in his "Underemployment in Asia." On

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[2]For example, Rosenstein-Rodan (57) in his "Disguised Unemployment and Underemployment in Agriculture" explained the purpose as ". . . clarifying the definition and describing the method by which surplus population in agriculture can be measured or estimated" (p. 1).

disguised underemployment he wrote:

> Even where visible underemployment is absent in Asian agriculture, there may still be disguised underemployment. Agricultural production may absorb the total labour supply of the community but, with the same amount of capital, with the same institutional framework and with the same size of landholding, it may be possible that, by raising the intensity of work per hour, by improving the organization of work and division of labour and by introducing simple labour-saving devices requiring little or no net addition to capital outlay, a number of workers could be released from the land without reducing total agricultural output. The proportion of the agricultural labour force which could be so released indicates the degree of disguised underemployment prevailing in the community in question" (pp. 709-710).

And on potential underemployment he stated that "The term 'potential underemployment' may be used to describe the amount of labour which might be released from the land without reducing total output by more fundamental changes in methods of production than those envisaged above--by changing the method of cultivation, by increasing the substitution of capital for labour and by enlarging the size of landholdings" (p. 710).

Although Rosenstein-Rodan firmly adhered to the static concept he recognized and defined the dynamic approach. For him any degree of change in agricultural production is a dynamic concept. In his article, "Disguised Unemployment and Underemployment in Agriculture" (57), he made a distinction between two degrees of dynamic surplus labor. He wrote:

> The second and quite different concept is the dynamic one, which refers to that amount of population ("potential surplus") which can be removed from agriculture without its output falling, assuming change in the method of cultivation. The change in the method of cultivation may range from a slight reorganization in fixed and variable capital, including a far-pushed mechanization. Obviously, according to the degree of change in the

> method of cultivation and the length of time assumed to be necessary for it, there may be different degrees of dynamic concepts. It is convenient to distinguish at least two degrees of dynamic ("potential") surplus: (i) assuming a minor change of method of cultivation obtained merely through a re-arrangement of work with but small additions of circulating capital, and (ii) the true dynamic surplus with the assumption of thorough change, including additional use of both fixed and variable capital" (pp. 1-2).

He then criticized the dynamic concept, "however, and this is important, all these dynamic concepts are full of pitfalls and are much less exact and certain in their meaning and result. Under no circumstances should they be confused with the unequivocal and basic concept of static disguised unemployment. Under very precise assumption and in specific circumstances, a clear meaning can be given to the dynamic concept" (p. 2). Rosenstein-Rodan's first degree of "dynamic surplus" which appears to be equivalent to Hsieh's "disguised underemployment" may be termed as a "semi-dynamic" concept of underemployment. His second degree of "dynamic surplus" which seems equivalent to Hsieh's "potential underemployment" may be termed a "dynamic" concept of underemployment.

Many economists consider it necessary to relax to a limited extent the strict *ceteris paribus* condition in order to prevent the reduction of output, however, not to the extent of Rosenstein-Rodan's second degree of "dynamic surplus." Their qualification can be termed as a semi-dynamic approach. Nurkse (44) in *Problems of Capital Formation in Underdeveloped Countries* clearly expressed his opinion on this point:

> We exclude technological advance, more equipment, mechanization, better seeds, improvement in drainage, irrigation, and

> other such conditions. We exclude these things here only in order to isolate the possibilities that stem from the presence of large-scale disguised unemployment. There is, of course, no question of excluding them from any development programme in practice.
>
> One thing, however, one need not and probably cannot exclude and that is better organization. If the surplus labor is withdrawn from the land the remaining people will not go on working in quite the same way. We may have to allow for changes in the manner and organization of work, including possibly a consolidation of scattered strips and plots of land (p. 33).

The same viewpoint also appeared in his "Excess Population and Capital Construction" (43), "To the extent that the labor surplus is absorbed--and concealed--through fragmentation, it cannot be withdrawn without bad effects on output unless the fragmentation is removed and the holdings are consolidated. . . . Appropriate reorganization of the other factors of production is clearly a necessary and a reasonable pre-requisite for purposes of policy as well as analysis" (p. 147). Gupta's (12) definition of underemployment in *Problems of Underemployment in India* allowed for minor changes: "Disguised unemployment may be defined as the part of the labour force which can be released from certain sectors of an economy without changing the capital-intensity and institutional framework, but by shifting some labourers to other productive work so that the remaining labourers may find full-time work (at least during that part of the year when season allows them to work), and further by improving the organization of work and division of labour, and also by introducing simple labour saving devices requiring little or no net addition to capital outlay" (p. 9). Hagen (15) considered that the definition allowing for relatively simple adaptation of production methods is a more practical definition of underemployment. He said:

> By a strict definition, the term underemployment refers (in agriculture) to a condition in which, if some workers were removed from agriculture, the same total output could be produced by the remaining workers without any change in methods. I think it probable that this situation, strictly defined in this way, is fairly rare. Methods are in effect that make some use of all available labor. But if we modify the definition to what might be termed a practical one, namely that if some agricultural workers were withdrawn, the same total output could be produced by the remaining workers after a relatively simple adaptation of methods, then I think there can be little question there is a large amount of agricultural underemployment in China, Japan, India, Ceylon, Malaya, Indonesia, Egypt, countries of Southern and Eastern Europe and a number of other countries (pp. 193-194).

The controversies of whether surplus labor exists and to what extent it exists are very much a definitional issue. From the above discussions we can see when the *ceteris paribus* condition is relaxed somewhat, there will exist more laborers who may be considered as "surplus."

II. Marginal Productivity of Labor

Marginal productivity of labor has been a central issue in the discussion of the concept of underemployment. Opinions of this concept, however different they may be, have largely revolved around the assumption of zero marginal productivity of labor.[3] In this section various aspects of the assumption of zero marginal productivity of labor will be discussed and then, a recently developed proposition of surplus labor with a positive marginal productivity will be presented and finally, the interpretations of "labor" as laborer and labor time will be considered.

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[3]The assumptions of "negligible" and "negative" marginal labor productivity are the two other magnitudes in the literature, but they usually are assumed along with zero marginal productivity of labor.

Zero Marginal Productivity of Labor

The proponents of the concept of underemployment, in defining underemployment, use different magnitudes of the marginal productivity of labor, usually, zero marginal productivity of labor. This zero marginal productivity of labor first appeared in the definitions written by the U.N. experts (66), and Navarrete and Navarrete (42). Subsequently, a similar assertion is found in Nurkse's (43) writing. He wrote, "This simplest definition of it implies that some labor could be withdrawn from subsistence farming without reducing the volume of farm output. In technical terms, the marginal productivity of labor is believed to be zero" (p. 146). In defining the "static" concept of underemployment, Rosenstein-Rodan (57) stated, "The first is a static concept referring to that amount of population in agriculture which can be removed from it without any change in the method of cultivation, without leading to any reduction in output. The marginal productivity of labor, in other words, is zero" (p. 1). Lewis's (29) unlimited labor supply was attributable to zero marginal labor product. In explaining this, he noted, "An unlimited supply of labor may be said to exist in those countries where population is so large relatively to capital and natural resources, that there are large sectors of the economy where marginal productivity of labor is negligible, zero, or even negative" (p. 402).

When discussing underemployment many of the critics of this concept also have considered underemployment to mean zero marginal productivity of labor. This way of considering underemployment can be seen, for example, in Haberler's and Viner's writings. Haberler (13)

in his "Critical Observations on Some Current Notions in the Theory of Economic Development" wrote, "Disguised unemployment is said to be present if a part of the labor force, say 5%, can be removed from the farms without reducing aggregate output; in fact aggregate output may even increase when the input of labor is reduced. It is, in other words, a case of zero (or negative) marginal productivity of labor" (p. 150). Viner (68) in his "Some Reflections on the Concept of Disguised Unemployment" noted that, "The term 'disguised unemployment' is commonly used to designate a situation in which the removal from a working combination of factors of some units of labor, nothing else of consequence or worth mentioning being changed, will leave the aggregate product of the working combination undiminished, and may even increase it. To say that there is 'disguised unemployment' is therefore equivalent to saying that in that working combination the marginal productivity of labor is zero or almost zero and may even be a negative quantity" (p. 151).

Why should it be so important to assume zero marginal productivity of labor in the discussion of underemployment? Georgescu-Roegen (11) provided some explanations in his "Economic Theory and Agrarian Economies." He wrote,

> Now, to say simply that part of the population could disappear without causing any decrease in output is not sufficient for a theoretical characterization of overpopulation. The national product of the United States could easily be maintained at the same level even though a large proportion of the population were to disappear. The *differentia specifia* between the two situations is that in the latter the national product could be increased if people simply chose to have less leisure, while in the former, not. This difference reveals that the situation where the marginal productivity of labor equals zero is the starting point in searching for a definition of overpopulation (p. 157).

Causes of Low or Zero Marginal Productivity of Labor

A discussion of the reasons for low or zero marginal productivity of labor in the literature may be presented in these terms.

(1) Excess Population Relative to Land and Capital

Low or zero marginal productivity and idleness of labor are usually considered as the symptoms of underemployment in subsistence agriculture. This phenomenon is said to be usually rooted in (a) rapid population growth accompanied by a lack of alternative employment opportunities under the conditions of limited complementary resources and (b) the low level of technology in agricultural production in underdeveloped areas. In regard to the factor of resource constraints, the U.N. experts (66) explained that "Under-employment is due to a deficiency of the resources which are necessary to employ productively the available supply of labour. It is usually associated with family employment where, in agriculture or industry, the unit of production and of the supply of labour is the family; it exists because the resources of the family are too small to keep all working members of the family fully employed throughout the year and because there exist no opportunities for directing a part of the supply away into other occupations at appropriate times" (p. 8). Also in the Indian Government's (19) *The First Five Year Plan--A Draft Outline* of 1951, the cause of underemployment was stated to be "Corresponding to idle labour, there are no adequate supplies of other cooperating factors of production, such as land and capital equipment" (p. 19). Similar statements along this line can also be seen in Navarrete and Navarrete's paper (42). They wrote, "The other two

types of underemployment (structural underemployment and the underemployment of expansion), which are much more important in the underdeveloped economies, are mainly due to lack of productive equipment" (p. 342). Likewise, Lewis (29) stated that "In the first place, an unlimited supply of labour may be said to exist in those countries where population is so large relatively to capital and natural resources, that there are large sectors of the economy where the marginal productivity of labour is negligible, zero, or even negative" (p. 402). In analyzing population pressures on the land and agricultural underemployment, Nurkse (43) wrote:

> Consider for a moment the effects of population growth in a community of peasant cultivators. Numbers are increasing while land, capital and techniques remain unchanged. Alternative employment opportunities may be lacking because of the decline of traditional handcraft industries due to the competition of imported manufactures.
>
> With the growing pressure of people on the land, farms become smaller and smaller. What is more, farms are divided and subdivided into tiny strips and plots. Accordingly it seems to me that agricultural unemployment in densely populated peasant communities may be said to take at least two basic forms: (1) underemployment of peasant cultivators due to the small size of farms; (2) unemployment disguised through fragmentation of the individual holding (p. 147).

(2) Technological Restraints

At the beginning of his book, *Transforming Traditional Agriculture*, Schultz (61) pointed out the relationship between the technological factor and agricultural production: "The man who farms as his forefathers did cannot produce much food no matter how rich the land or how hard he works. The farmer who has access to and knows how to use what science knows about soil, plants, animals, and machines can produce an abundance of food though the land be poor. Nor need he work nearly so hard and long. He can produce so much that his brothers and some of his neighbors will move to town to earn their

living. Enough farm products can be produced without them" (p. 1). Obviously, if technology can be a factor in improving the marginal productivity of labor and its complementary resources, it also can be a factor in restraining them. In fact, low or zero marginal productivity of labor has been explained by many economists as a result of constant methods of cultivation.

Writing "Factor Proportions in Underdeveloped Countries" in 1955, Eckaus (8) was one of the few who systematically analyzed the technological restraints which might lead to zero marginal productivity of labor. In his analysis, labor and capital are assumed to be the only two factors of production. Land is implicitly treated as one form of capital. His presentation of agricultural production in Figure 1 (p. 369) places capital and labor on the vertical and horizontal axes, respectively.

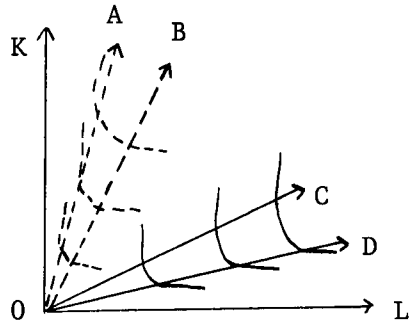


Figure 1. Isoquant map for capital and labor.

Assuming a variable-proportions production function in the isoquant map, a given level of output can be produced by varying combinations of labor and capital. Since labor is relatively abundant compared to capital in undeveloped areas, especially in the agricultural sector, labor-intensive techniques are usually employed

in the production process. In terms of Figure 1, the expansion lines OC, OD and those in between represent the employment of labor-intensive techniques in production. Under a given state of technology, there exists a minimum amount of capital which must be combined with labor in order to produce a given level of output; and given that minimum amount of capital, an increase of labor will not increase the output level. In other words, the marginal productivity of the abundant factor, labor, becomes zero along the ridge line. In our isoquant map, along the ridge line OD, the marginal productivity of labor is zero.

There are two ways to prevent the occurrence of zero marginal productivity. One is by introducing new techniques which substitute labor for capital in the production process, which means extending the ridge line toward the horizontal axis in the isoquant map. The other way is by increasing the quantity of the scarce factor, capital, which needs labor as the counterpart in the process of production. Through these two practices, the marginal productivity of labor can be raised and more labor can be absorbed into agricultural production.

In the subsistence agricultural sector, due to the pressure of a rapidly increasing labor force in the already densely populated underdeveloped countries, the capital-labor ratio becomes smaller and smaller until finally it hits the ridge line where zero marginal productivity of labor occurs. Having inappropriate factor endowments--too much labor, too little capital--and lacking advanced techniques which allow the substitution of abundant labor for scarce capital, the agricultural production necessarily remains at the stage of zero marginal productivity of labor.

(3) Cultural Constraint

Low productivity of labor in subsistence agriculture is attributable to cultural factors according to Mellor's (38) argument in "The Use and Productivity of Farm Family Labor in Early Stages of Agricultural Development." There are two underlying assumptions in this argument; one is that the marginal utility of added goods and services income drops substantially once subsistence is met and the other is that the productivity of labor is such that incomes commonly range around the subsistence level. He argued that the peasant in the underdeveloped country works hard to achieve some traditionally determined minimum standard of living, but has no incentive for increasing his income above that level because of tradition-bound consumption patterns.

(4) Nutritional Impediments

Low productivity of labor caused by malnutrition due to low earnings has also been discussed in the literature. This point was noted in Hsieh's (17) article: "Where workers appear to be working all day, their intensity of work is often low, owing in part to poor physique and lack of stamina resulting from low earnings and undernourishment" (p. 722). In his "The Theory of Underemployment in Backward Economies," Leibenstein's (27) theory was mainly based on "the wage-productivity relationship" in which the relation between nutrition and productivity was explained. He gave two types of evidence to illuminate his position; one ". . . derives from numerous physiological experiments the results of which enable one to calculate the calories needed for various types of activities"

(p. 64); the other one ". . . is shown very clearly in a number of studies by Kraut and Muller made in Germany between 1942 and 1945" (p. 65). Leibenstein showed from the first type of evidence that those workers whose calorie intake is under 2140 calories, although ".. . . working what appears to be a full day . . ., they will work much more slowly, with less energy and enthusiasm, in a more lethargic fashion, and probably with a greater degree of absenteeism" (pp. 64-65). From the second type of evidence, he found, "The experience of miners in the Ruhr district also reported by Kraut and Muller confirmed these general results. On the average, the mining of a ton of coal required about 1200 calories, and when, during the war period, the calorie intake of the miners was reduced, output fell proportionately, and when at a later stage the diet was increased, production rose proportionately" (p. 65).

Explanations of Laborer's Being "Disguisedly" Unemployed

When zero marginal productivity of labor is assumed, it would be quite natural for anyone trained in Western economics to ask, "Who would employ these people if their product is zero?" "How can these marginal people live if they produce nothing?" and "Why in the subsistence agricultural communities is no overt unemployment observed if excess population in this type of community is said to be so great in relation to land and capital that marginal productivity of labor is reduced to zero?" The explanations for these questions have been interpreted according to the type of labor, that is, whether family labor or hired labor. A share-alike ethic is said to be the rule of life and work for peasant agriculture which mostly uses the family labor

force. Writers, such as Nurkse (44) and Lewis (29), have described this share-alike rule. Based on the wage-productivity relationship, the possibilities of underemployment of hired labor was postulated first by Leibenstein (28), then Muzumdar (34), and Wonnacott (73).

(1) Share-Alike Ethic

It has been argued that the phenomenon of disguised unemployment is sustained by the institutional force called the share-alike ethic. In peasant farming, family members usually constitute the major source of labor with considerably less use of wage labor. Work and income are shared among the members of peasant households. Each family member is more nearly a partner in the course of farming than simply part of the farm's labor force. As a partner he does not work for wages and is not subject to dismissal. Tasks are appointed by the head of the household, so that each member of the household has approximately the same amount of work to do. Earnings likewise are shared equally among the members. Therefore, although the marginal productivity of the laborers is zero, under the rule of the share-alike ethic each member of the peasant family receives an average share of the product which has a positive value. Since there are few if any opportunities for receiving an income higher than the family farm's average product, there is no motivation to leave the farm, thus perpetuating the disguised unemployment.

(2) The Postulate of the "Wage-Productivity Relationship"

The wage-productivity relationship, according to Leibenstein (28) consists of two interrelated parts, that is, (a) the relation between income (i.e., wages) and nutrition and (b) the relation between

nutrition and productivity. Through this relationship a higher nutrition intake of labor afforded by higher income can increase labor productivity more than proportional to the increase of income and vice versa. Based on this, Leibenstein presented his theory of underemployment for wage-labor. According to his wage-productivity postulate there are more than one set of average and marginal productivity curves which vary with different wage levels. Given a wage level and the corresponding marginal productivity curve, there is an optimum number of workers whom the landlords as a group would hire if they were to maximize their group income and this optimum is determined at the point where the wage is equal to the marginal productivity of the employed workers. Under the conditions of over-population, the whole supply of labor is supposed to be available at the minimum subsistence level. But the landlords would want to offer wages somewhat above the minimum because that would raise the labor productivity and more than compensate the landlords because their total income would, in fact, rise. The landlords will, of course, employ the optimum amount of labor appropriate to that wage level and the marginal productivity of labor of the employed workers will equal the proposed wage. However, in the face of a large number of unemployed workers, the landlords find it difficult to maintain the proposed wage level although it is in their interest to do so. The competition among the unemployed and the employed workers causes the wage level to be depressed, thus poor nutrition and the resulting small output per worker. To counteract this, the landlords must offer to employ the entire labor force. This they can not do at the proposed

wage level. Finally a compromised solution is reached, i.e., the landlords employ the whole labor force at a compromised wage somewhat below the proposed one but nevertheless somewhat above the minimum subsistence level. In summing up his position, Leibenstein wrote, "Hence, landlords, as a group, are in an improved position if institutional arrangements permit them to employ the entire labor force, pay a wage of W_3 [which is higher than the subsistence wage W_2], and yet not utilize the entire labor force. Possibilities and institutional arrangements of this sort can account for the phenomenon of disguised unemployment" (p. 75).

Surplus Labor with Positive Marginal Productivity of Labor

The long held identity between the existence of surplus labor and zero marginal productivity lost its underpinnings through Sen's (63) article, "Peasants and Dualism With or Without Surplus Labor" of 1966. According to Sen, under the situation that marginal labor productivity is zero, it will not follow that there is surplus labor; under the situation that marginal labor productivity is positive, it will not follow that there is no surplus labor. In other words, the assumption of zero marginal productivity is neither a necessary nor a sufficient condition for the existence of surplus labor. Indeed, under the ordinary condition, surplus labor coexists with a positive marginal productivity. These theoretical assertions advanced by Sen deserve a more detailed explanation.

Sen's model starts by illustrating the "economic equilibrium of a peasant family." Some of the basic assumptions are as follows:

(A) The family output Q, at a given point of time, is a function of labor L alone:[4]

$$Q = Q(L), \text{ with } Q''(L) < 0 \quad . \quad . \quad . \quad (1)$$

(B) Family income (= total output Q) is shared equally among the total members of the family and work (= labor L) is shared equally among the working members of the family.

(C) The individual utility function U is a function of individual income q and the marginal utility from income is positive and non-increasing:

$$U = U(q), \text{ with } U'(q) > 0 \text{ and } U''(q) \leq 0 \quad . \quad . \quad . \quad (4)$$

(D) The individual disutility function V is a function of individual labor l and the marginal disutility from labor is non-negative and non-decreasing:

$$V = V(l), \text{ with } V'(l) \geq 0, \text{ and } V''(l) \geq 0 \quad . \quad . \quad . \quad (5)$$

It follows that family welfare is maximized when

$$Q'(L) = V'(l)/U'(l) \equiv x \quad . \quad . \quad . \quad (10)$$

Here "x" is defined as the "real cost of labor" and is given by the individual rate of indifferent substitution between income and labor. The condition given by (10) demonstrates that at the economic equilibrium of a peasant family, labor is applied up to the point where its marginal product equals the "real cost of labor."

Surplus labor is defined by Sen as "that part of the labor force in this peasant economy that can be removed without reducing the total amount of output produced, even when the amount of other factors is

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[4]Labor is measured in terms of hours of work rather than number of persons.

not changed" (p. 428). The relation of peasant output to the working labor force is the key to the existence of surplus labor. To examine this relation it is necessary to refer to the real cost of labor. A reduction in output can occur only when the real labor cost rises.[5] Such a rise in the real labor cost can take place for two reasons: first, a decreasing marginal utility from income due to a rise of the share of income for each remaining member and second, an increasing marginal disutility from work due to a rise of the share of work for each remaining member. Both these effects will tend to push up the real labor cost and will shift the equilibrium to a smaller volume of family labor and total output. Then, under what circumstances will the withdrawal of part of the labor force not cause the reduction in output? In other words, under what conditions can the real cost of labor remain unchanged? Sen explains:

> The existence of surplus labor depends, in this model, therefore, on the marginal utility schedule and the marginal disutility schedule being *flat* in the relevant region. Only under that circumstance will a rise in individual effort leave the marginal disutility unaffected.
>
> The constancy of the marginal utility of income within a certain range implies an insensitivity of the usefulness of income to its quantity within this region. Given this assumption, with a suitable choice of units, we can make the constant value of marginal utility equal to unity, so that (10) reduces to the following:
>
> $$Q'(L) = V'(l) = x \quad . \quad . \quad . \quad (23)$$
>
> If, furthermore, the marginal disutility of effort remains constant, say at value z, until a certain critical amount of effort l^* is reached, then we have
>
> $$x = V'(l) = z > 0, \text{ for } l \leq l^*,$$
> $$V''(l) > 0 \text{ for } l > l \quad . \quad . \quad . \quad (24) \text{ (p. 429).}$$

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[5] Since output Q is a function of labor L, and labor itself is a function of marginal labor product Q'(L), therefore, Q = F[Q'(L)]. But marginal labor product Q'(L) equals the real cost of labor x at each point of equilibrium. Thus we have the relation: Q = F[Q'(L)] = F(x), i.e., output is a function of real cost of labor.

Notice in condition (24) the value of real labor cost x which is equal to the marginal productivity of labor Q'(L), is constant and *positive*. In terms of Sen's model, the assumption of zero marginal productivity of labor corresponds to the situation where the marginal disutility of labor remains flat (constant) at zero value (i.e., z = 0). It is not a necessary condition for the existence of surplus labor. That it is not a sufficient condition for the existence of surplus labor is also explained by Sen. He wrote, "That it is not sufficient follows from considering the case when z = 0, but $l = l^*$, where marginal product of labor is zero, but any finite withdrawal of the peasant labor force will reduce the level of output" (p. 431).

Similar discussions which coincide with Sen's viewpoint of surplus labor and marginal productivity of labor also have appeared in the more recent literature. This can be seen, for instance, in Wellisz' (72), Myrdal's (41), and Desai and Mazumdar's (6) writings.

Interpretation of "Labor": Laborers and Labor Time

The very notion of "labor" has been implicitly or explicitly interpreted in terms of the number of workers by those who assert the assumption of zero marginal productivity of labor. Many opponents of this assumption also treat the concept of labor as number of laborers. Yet why would workers continue to work even though they are not producing anything? To answer this question, it is necessary to distinguish between the amount of labor and number of laborers, as Sen (62) suggested in his "Choice of Techniques." Sen observed that "Not that too much labor is being spent in the production process, but

that too many laborers are spending it" (p. 15). Myrdal (41) also pointed out that "The concept of marginal productivity of labor must logically refer to the labor input, which in the ordinary way must be reckoned, not by the size of the labor force, whether it is working or not, but by the hours, days and weeks of actual work" (p. 2052). When labor is interpreted as the number of laborers, laborers are abundant. And when labor input means the amount of time worked, labor time is employed only up to the point where its marginal product is zero. In this situation, underemployment takes the form of a smaller than "normal" number of working hours per laborer per year. And although the marginal productivity of labor is just equal to zero at the margin, the marginal productivity of laborers is zero over a wide range. If each laborer is working a number of hours that is less than the "normal" hours of work per laborer, the same total product could be produced by fewer laborers working normal hours. In terms of the model put forward by Sen (63), where it was shown that surplus labor can coexist with positive marginal productivity of labor, the "coefficient of labor hours" is positive, while the "coefficient of laborers" is zero.

III. Surplus Labor and Economic Development

The concept of underemployment has been made a cornerstone in the theory of economic development for developing countries since World War II. It may be said that the theory of economic development with cheap supplies of labor has been built on the basis of the theory of capital accumulation. In section I we shall briefly

review how the importance of capital accumulation has been heavily emphasized in the theory of economic development. In section II three main contributors'--Nurkse, Lewis, and Ranis and Fei--versions of the theory of economic development will be introduced. In section III criticisms of Nurske's, Lewis's and Ranis and Fei's theories of economic development will be discussed.

Capital Accumulation and Economic Development

It has been considered that a major impediment to the economic development of developing countries has been their inability to form capital.[6] Heilbroner (16) succinctly expressed this viewpoint: "The low level of agricultural productivity is largely due to an inability to apply capital to the productive process. . . . This impoverishing absence of capital is by no means confined to agriculture. On the contrary, the problem pervades every underdeveloped economy from top to bottom. It is for the lack of capital of every sort, not just for lack of capital on land, that the underdeveloped nations are unable to produce adequate income" (pp. 42-43).

Capital accumulation has been emphasized as the main factor governing economic development. For example, in a United Nations study (67), *Programming Techniques for Economic Development*, the role of capital accumulation was stated in this way: ". . . capital accumulation may very well be regarded as the core process by which all other aspects of growth are made possible" (p. 92). Rostow (58) in his *The Stages of Economic Growth* explicitly specified a

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[6]Capital meaning "capital goods."

rise in the productive investment to over 10 percent of national income as a necessary requirement for a country's take-off. Similarly, in presenting his model of economic development Lewis (29) contended that "The central problem in the theory of economic development is to understand the process by which a community which was previously saving and investing 4 or 5 percent of its national income or less, converts itself into an economy where voluntary saving is running at about 12 to 15 percent of national income or more. This is the central problem because the central fact of economic development is rapid capital accumulation (including knowledge and skills with capital)" (p. 416).

Economic Development with Surplus Labor

(1) Nurkse's "The Saving Potential Concealed in Rural Underemployment"

Based on the assumption that large-scale underemployment exists in many developing countries, Nurkse (44) in *Problems of Capital Formation in Underdeveloped Countries* proposed a theory of economic development that uses surplus rural people to form capital.[7] He explained how this idea was formulated:

> Disguised rural unemployment differs in several ways from open industrial unemployment. It differs notably in that it cannot be absorbed by means of an expansion of monetary demand. . . . there is the possibility, however, of taking the surplus people away from the land; anything they could produce elsewhere would be a clear addition to the real national income. But

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[7] For Nurkse, surplus people denotes those whose marginal productivity is zero. They subsist on a share of their family's total product. These surplus people can be removed from farms without leading to any reduction in production when some kind of better organization in agriculture, e.g., a consolidation of scattered strips and plots of land, takes place.

> what can they produce without capital? Very little. Then why not set them to work on producing real capital? Here we get a first glimpse of what disguised unemployment can mean for capital formation. Even if the direct marginal yield of labour is zero, the indirect yield of labour when applied to roundabout methods of production--that is, to the accumulation of capital--is likely to be very high in countries where capital is scarce (p. 36).

The problem encountered in this sort of capital formation scheme is, "How are people to be fed when they are set to work on capital projects?" Nurkse, in answering this question, presented what he termed as the saving potential concealed in rural under-employment. In a community with disguised unemployment, "unproductive" surplus laborers are supported by "productive" laborers who produce more than they consume.[8] In this sense the productive laborers are performing "virtual" saving. This virtual saving could be converted from "abortive" to "effective" saving if the unproductive surplus laborers were set to work on capital projects--irrigation, drainage, raods, railways, houses, factories, and so on--and were continuously fed by productive laborers. Thus the use of disguised unemployment for the accumulation of capital could be financed from within the system itself and the unproductive consumption of the surplus farm population could become productive consumption.

The success of the capital formation scheme hinges on the degree of ". . . the mobilization of the concealed saving potential in the shape of the food surplus that becomes available to the

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[8] Nurkse noted that the separation of the two groups is not possible, since there is no way to distinguish a person who is unemployed in disguise; the use of the terms productive and unproductive laborers was for the sake of convenience in explaining his theory of disguised unemployment.

productive persons when their unproductive dependents go away" (p. 38). There are three possible factors which can affect the performance of this mobilization and cause leakage of the "subsistence fund" available for capital formation. The first factor is that the food consumption of the remaining peasants is likely to increase because they have been living near subsistence level. The second factor, the investment workers, i.e., the previously unemployed in disguise, may have to eat more than before because they are now more actively working. The third factor is the cost of transporting the food from the farms to places where the capital projects are established. In light of the possible leakages some amount of complementary saving which may be supplied by domestic saving or foreign loans is therefore needed for the promotion of the capital formation scheme.

Financing the tools for the new investment workers constitutes another issue in the problem of financing capital formation. This problem can also be solved through the use of this surplus labor. "The investment workers, before they start building a piece of fixed capital such as a road, could, after all, sit down and make the necessary primitive tools with their hands, starting if need be from scratch" (p. 44), Nurkse argued. This is based on the view that the densely populated countries in the process of development require those types of tools and machines that are of a less capital intensive nature than those of the economically developed countries.

The type of capital formation projects will have to depend upon the situation in individual countries. However, some types of

"social overhead capital," such as public utilities, transport facilities, training schemes and various services are likely to be the initial projects because such over-all facilities form an essential basis for small-scale private investment.

(2) Lewis's "Economic Development with Unlimited Supplies of Labor"

With the notion of dualism and the concept of underemployment, Lewis (29) presented a two-sector model in which capital accumulation was made possible through the use of unlimited labor supplies. In this model, the economy is composed of two sectors, the capitalist sector and the subsistence sector. The capitalist sector is defined as that part of the economy which uses reproducible capital, pays capitalists for the use thereof, and employs wage-labor for profit-making purposes. Capitalist production need not be restricted to manufacturing; it may also be in plantations or mines where labor is also hired for profit. The capitalist sector may be either private or public, with the distinguishing features being the hiring of labor and the sale of its output for a profit. These activities can be undertaken by public as well as private enterprises. The subsistence sector is that part of the economy which does not use reproducible capital (the indigenous traditional sector). In this sector, the productivity of each laborer is much lower than that in the capitalist sector, that is, under the existing complementary resources and techniques, labor productivity actually is zero or negative--a condition which constitutes the existence of disguised unemployment.

Sources of unskilled labor in the subsistence sector not only exist in agriculture but also exist in the whole range of casual

jobs--workers on the docks, jobbing gardeners, petty retail traders, etc. Besides this type of "self-employed" labor, surplus labor also includes the wage-labor in domestic service, such as servants, retainers and messengers. The other two important sources of surplus unskilled labor are women who do household work and the increased population resulting from the excess of births over deaths.

The fundamental relationship between the capitalist sector and the subsistence sector is that ". . . as more capital becomes available more workers can be drawn into the capitalist from the subsistence sector, and their output per head rises as they move from the one sector to the other" (p. 408). The wage which the expanding capitalist sector has to pay is determined by what people can earn in the subsistence sector. The earnings in the subsistence sector, especially in agriculture, approximately equal the peasants' average production, therefore, men will not leave their farms unless they can receive wages from other employment at least equal to the average farm product. And, "Earnings in the subsistence sector sets a floor to wages in the capitalist sector, but in practice wages have to be higher than this, and there is usually a gap of 30 percent or more between capitalist wages and subsistence earnings" (p. 410). This gap is explained as a compensation for the higher cost of living in the caplitalist sector and ". . . the psychological cost of transferring from the easy going way of life of the subsistence sector to the more regimented and urbanized environment of the capitalist sector" (p. 410). The supply of labor is unlimited at the existing capitalist wage, so long as the supply of labor exceeds the demand. In this situation

new industries can be created or old industries expanded without limit.

This situation is illustrated in Figure 2, where the horizontal axis measures quantity of labor and the vertical axis the wage and marginal productivity. OS is the earning in the subsistence sector and OW is the capitalist real wage. At the constant wage OW, the supply of unskilled labor to the capitalist sector is perfectly elastic and therefore the supply curve is a horizontal line WL. Assuming profit maximization, capital will then be applied up to the point where the marginal productivity of labor equals the current wage. If OW is the current wage, then only OQ amount of labor will be hired. Beyond Q, workers earn what they can in the subsistence sector. The output in the capitalist sector ON_1PQ is divided into two parts, the WN_1P part is the capitalist surplus and the OWPQ part is the wage paid to workers.

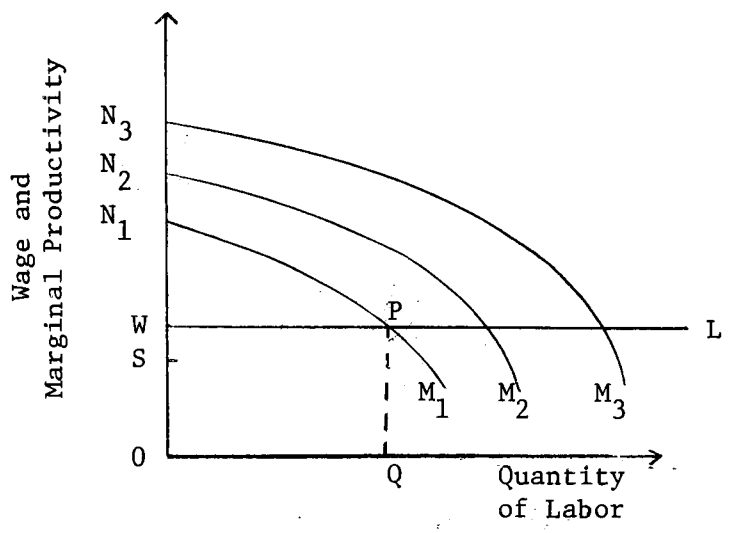


Figure 2. Economic expansion with a constant wage.

In tracing the process of economic expansion, Lewis emphasized that the key to the process is the use of the capitalist surplus. He explained that "In so far as this [capitalist surplus] is invested in creating new capital, the capitalist sector expands, taking more people into capitalist employment out of the subsistence sector. The surplus is larger still, capital formation is still greater and so the process continues. . ." (p. 412).

Figure 2 illustrates this economic expansion by the outward shift of the demand for labor, from N_1M_1 to N_3M_3 over time. This process occurs as part of the initial surplus WN_1P is reinvested, the amount of the fixed capital increases and the schedule on the marginal productivity of labor is then raised to the level of N_2M_2. Both the capitalist surplus and capitalist employment are now larger. Further investment then raises the marginal productivity of labor to N_3M_3. And so the process continues.

The growth of capitalist profits is crucial in this process. As the capitalist sector expands, the share of the profits in the national income increases. Since the major source of savings is profits, savings and capital formation also increases as a proportion of the national income.

The capitalist sector cannot expand in these ways indefinitely since capital accumulation can proceed faster than population can grow. When the surplus is exhausted, wages begin to rise above the subsistence level. This will raise real wages in the capitalist sector and therefore reduce the capitalist surplus and the rate of capital accumulation.

(3) Ranis and Fei's "A Theory of Economic Development"

Based on Lewis's model (29), Ranis and Fei (49) provided a rigorous analysis of ". . . the transition process through which an underdeveloped economy hopes to move from a condition of stagnation to one of self-sustained growth" (p. 181) and presented a two-sector model, i.e., the agricultural sector with surplus labor and the industrial sector with no surplus labor. The process of development in their model consists of the re-allocation of surplus agricultural workers to the industrial sector where they become positive members of the labor force at a wage equal or tied to the institutional wage in the agricultural sector.

Surplus labor in the agricultural sector in Ranis and Fei's model has two components: (a) disguisedly unemployed agricultural labor force--that part of the labor force whose marginal productivity is less than its average productivity; and (b) redundant agricultural labor force--that part of the disguisedly unemployed labor, whose marginal productivity is zero and who may be removed without affecting total agricultural output. The real agricultural wage is considered equal to the average output of labor at the initial point where the entire agricultural labor force is engaged in agricultural production. This assumption is explained by the authors in this way: "The persistence of this wage level is sustained by institutional or nonmarket forces since under competitive assumptions the real wage would fall to zero, at equality with marginal physical productivity. We shall call this the institutional wage" (p. 183).

Ranis and Fei's analysis comprises two parts, i.e., static analysis in which no change in agricultural productivity and population is assumed, and dynamic analysis in which the above assumption is relaxed. In their static analysis the development process in surplus-labor economies evolves through three phases; the redundant labor phase, the food shortage phase and the self-sustained phase.

Phase 1 is characterized by the existence of redundant labor in agriculture. This phase is comparable to the development process in Lewis's (29) model. The industrial sector can expand by absorbing the "unlimited" agricultural labor force at low and constant wages until the redundant surplus labor is depleted. The completion of phase 1 is reflected in the ending of the horizontal labor supply curve which turns upward hereafter because the domestic terms of trade turn against industry. In phase 2 farm workers whose marginal products are positive but less than agricultural wages are absorbed into the industrial sector. It follows that farm output declines, food shortages occur and the terms of trade between the two sectors are altered in favor of the agricultural sector. The deterioration in the terms of trade for the industrial sector causes a rise in the industrial real wage and this is reflected in the upward sloping of the labor supply curve.

The agricultural real wage in both phase 1 and phase 2 equals the institutional wage since the marginal product of farm labor is less than the institutional wage. As the re-allocation of labor continues, the reserve of surplus labor will come to an end. The marginal product of the remaining farm workers will finally catch up

to the institutional real wage, thus phase 3 begins. This arrival at phase 3 is crucial to the process of economic development as noted by Ranis and Fei, "The transition into phase 3 constitutes a major landmark in the development process. With the completion of the transfer of the disguisedly unemployed, there will occur a switch, forced by circumstance, in employer behavior, i.e., the advent of a fully commercialized agricultural sector. This landmark may be defined as the end of the take-off process. We know no other way to establish a nonarbitrary criterion for any economy reaching the threshold of so-called self-sustained growth" (p. 186).

To give more depth to this economic process Ranis and Fei gave further attention to the important aspects of phase 2 by explaining and amplifying Lewis's presentation. Lewis (31) explained the turning point of the horizontal industrial labor supply curve rather loosely as occurring when one of the following events puts an end to the horizontal supply curve of labor: (a) the worsening in the terms of trade for the industrial sector and (b) the exhaustion of the labor surplus in the agricultural sector. In Ranis and Fei's article the effects of these two events on the labor supply curve were analyzed in this way, "Putting the two factors (a and b) together, we can say that as labor is re-allocated from the agricultural to the industrial sector, the industrial supply curve turns up (i.e., the Lewis turning point occurs), in the first instance (at "t"), due to a shortage of agricultural goods traceable to the disappearance of the redundant agricultural labor force; and that this upward trend in the industrial real wage is later accentuated (at X') by the upward movement of

the agricultural real wage traceable to the complete disappearance of the disguisedly unemployed labor force and the commercialization of the agricultural sector" (p. 188).

The main contribution of the authors in this article lies in advancing a "dynamic" analysis which allows an increase in labor productivity in the agricultural sector by means of capital investment in that sector. This is distinct from the "static analysis" of Lewis in which the main variable is labor reallocated from the subsistence to the capitalist sector.

With the assumption that as agricultural productivity increases the institutional wage remains unchanged, it can be seen that an increase in agricultural productivity can speed up the process of econonic development. First, due to the increase in agricultural productivity, more of the "unlimited" agricultural labor can be released to the industrial sector and at the same time, the food supply can be maintained for the industrial workers. Second, without a food shortage the deterioration in the terms of trade will not occur. Thus the real industrial wage paid to the industrial workers and measured in terms of industrial goods can be kept constant. Phase 2 is thereby eliminated. Third, the employment of labor with a constant wage rate enables the industrial sector to reap more profits and hence increases the rate and speed of capital accumulation. This, in turn, increases the rate and speed of the absorption of surplus agricultural labor. The ultimate result of increased agricultural productivity will be the earlier arrival of phase 3, i.e., the stage of self-sustaining growth in which the

marginal productivity of agricultural labor is higher than the institutional wage and the employment of agricultural labor is fully commercialized.

Criticisms

While the theory of economic development with the assumption of surplus labor has been praised by Kindleberger (25) as having ". . . considerable explanatory power in economic history and in the growth of developed countries" (p. 181), to many critics this kind of theory is a useless construct. In this section some specific criticisms of Nurkse's (44), Lewis's (29), and Ranis and Fei's (49) theories of economic development will be introduced.

(1) Criticisms of Nurkse's Theory

The possibility of a food shortage was considered as a crucial variable in Nurkse's discussion of "the subsistence fund available for capital formation." Yet one important cause of a food shortage was ignored by Nurkse, as later pointed out by Viner (68), ". . . the inevitable and the possibly appreciable loss of food involved in deterioration, spoilage, and spillage when the food is consumed in the city instead of on or near the farm where it is produced" (p. 81).

Nurkse's "capital formation by peasant transfers from the land" was considered by Junker (22) as an "all too easy way" for economic development. Junker argued, "If the transfer of men is the way to greater capital formation then India should be one of the great industrial nations of the world. Not only can men be transferred from the

land, they can be picked up from the streets of all India's major cities" (pp. 42-43). Furthermore, Junker maintained that "It is simply foolhardy to say, 'disguised unemployment in overpopulated peasant economies may be said to contain a hidden source of saving available for economic development,' unless that which is disguised is trained labor, unless there is a shortage of labor otherwise, and unless productive use can be made of that labor when the transfer is made. On all these counts the response would be negative in many of the underdeveloped countries" (p. 43).

(2) Criticisms of Lewis's Theory

Lewis's article (29) is not only the most influential essay on the theory of using surplus labor for economic development but also the one which received the most criticisms. In his model, Lewis simply took for granted the demand side of the investment process by assuming that a capitalist class already exists in developing countries. Meier (36) disagreed: "A major obstacle to development in many countries still may be the absence of a capitalist class with the necessary ability and motivation to undertake long-term productive investment. We must confront the problem of how a class of private capitalists is to emerge, or else we must rely at the outset on the presence of foreign capitalists or a class of state capitalists. The analysis of the behavior in the capitalist sector may have to be modified, according to which type of capitalist class exists" (p. 162).

It was also assumed that whatever the capitalist sector produces, it can sell. No allowance was made for the problem of

aggregate demand. Meier (36) asked:

> . . . why should this be true if the output is to be sold within the capitalist sector itself, or if the product is an export good? The remaining alternative--that the capitalist sector sells to the non-capitalist sector--presents a special difficulty. For then productivity must rise in the non-capitalist sector in order to ensure an adequate market for the output of the capitalist sector. But if real wages rise in the non-capitalist sector, the supply-price of labor to the capitalist sector will then be higher, profits will be reduced, and the expansionary process may stop before the surplus labor is absorbed (p. 162).

The "unlimited" supply of unskilled labor is the assumption that has received the most criticism. According to Lewis, the "unlimited" supply exists whenever the supply of labor at a given capitalist wage rate exceeds the demand. This capitalist wage rate is tied to what can be earned in the subsistence sector. However, for Sutcliffe (65) there are two reasons that ". . . it is illegitimate to infer that the existence of surplus unskilled labour (openly unemployed or very underemployed) validates the assumption that labour supply is, in the short run, unlimited" (p. 120). These reasons are, "First, the effective supply of unskilled labour may not be as large as the apparent supply, simply because it is determined by the supply of the complementary factor, skilled labour. George Rosen says that 'the scarcities of specific types of labour--skilled and semi-skilled, trained technicians and engineers--make the notion of unlimited labour supply a hollow one to the industrialist.' Second, even a real labour surplus may not be reflected in the wage rate, either because it is determined by the wage policies of governments, or of foreign firms, very occasionally by the strength of trade unions, or by other institutional factors" (pp. 120-121).

Hence capitalist wage rates (often interpreted as urban wage rates) may easily diverge from Lewis's constant real wage rate. In regard to the relationship between the average product of the subsistence farming sector and real wages in the capitalist urban sector, Willisz (72), in his recent article, contended, "The rural average product provides a floor under the urban wages only if there is no possibility of making transfers from the rural to the urban members of the family" (p. 41).

Confirming Sutcliffe's contention is the example of Reynolds' study (52) in Puerto Rico where excess labor did not prevent a rising urban wage rate. Whereas a case favorable to Lewis's theory is Egypt where the assumptions of the unlimited labor supply model have been fulfilled in the sense that labor surplus has persisted and real wages have not risen very rapidly. Yet here the optimistic predictions of the model, that the labor will be drawn into more productive industrial activities, have not followed. So Mabro (32) argued that ". . . the Egyptian situation shows clearly that the expansion of an industrial sector can not absorb over a relatively long period of time more than a small share of the natural increase in the labour force, even if all Lewis's assumptions with regard to wages, terms of trade and capital intensity are met" (p. 346). And although Egypt is probably one of the very few countries in which the assumptions of the Lewis model have, in fact, been persistently fulfilled over a considerable period of time, there are major problems. Mabro pointed out that ". . . the result is negative as far as employment is concerned. Part of the difficulty is due to the investment

behavior of capitalists, part to the very nature of manufactures. But by far the most important challenge is population growth. Lewis's article underestimates its significance. In fact, it dominates the labor re-allocation process, adding to the pools of underemployed at a rate at which may exceed for a long time the rate of absorption into industry" (p. 346).

(3) Criticisms of Ranis and Fei's Theory

Criticisms of the assumptions and predictive ability of Lewis's two-sector development model are usually applicable to Ranis and Fei's theory. Writing specifically about the Ranis and Fei's model, Oshima (46) raises some issues concerning the validity and empirical relevance of their model. First, on the worsening of the terms of trade which characterize the second phase of their model, Oshima argued that "It seems highly artificial to assume a closed system in a theory which makes the worsening of the terms of trade a corner-stone" (p. 196). In Asia, ". . . if import of agricultural products is assumed, the terms of trade need not change," for example, "In Japan before the war, the import of cheap farm products from Taiwan and Korea improved the terms of trade for the industrial sector" (p. 196).

Second, on the commercialization point which begins the third phase, Oshima wrote, "It appears to me that in this closed model this point will be the beginning of hyper-inflation. For now, to the extent of the MPP of the workers leaving the farm, there will be a shortage of agricultural products, and this shortage will increase rapidly as the migration continues, even if some decline in the

income elasticity of agricultural-product demand is taken into account" (p. 196).

Third, on the assumption of the long-run fixity of land, Oshima contended, "In the long-run, the amount of land is by no means fixed, as the statistics of farm acreage for Asian countries show. Extra-marginal land is brought into cultivation, e.g., hill-sides, forests and jungles" (p. 197).

Finally, Oshima strongly attacked the constant institutional wage in this way: "The part of the model (and most crucial to it) which is most difficult to accept from an empirical standpoint is the assumption that, with the rise in farm productivity, farm wages in the first two phases remain unchanged. A general rise in Asian farm productivity will be immediately reflected in a rise of real income for the peasant-proprietor and his family, since the tax structure is such that only a small part of the increases is likely to be taxed away. The absolute share of tenants will increase because in Asia the total crop of landlord farms is often divided on the basis of percentage shares. I suspect that investigations into farm wage will show that, with productivity increases, wages do rise in Asian agriculture" (p. 199).

CHAPTER IV

EMPIRICAL STUDIES OF UNDEREMPLOYMENT

I. Types of Empirical Studies

The earlier empirical studies of underemployment were largely survey-type observations of an excess labor force on the land. There are Warriner's (69), Rosenstein-Rodan's (57), and Mandelbaum's (33) estimations suggesting that one-quarter to one-third of the pre-war population in Eastern and Southeastern Europe were unemployed in disguise. A number of studies estimated that 40 to 50 percent of rural Egyptian population were surplus. These instances were cited in Nurkse's book (44) which was also based on these man/land ratio observations.

Post-war empirical studies of underemployment may be categorized into three major types according to their distinctive approaches. They are: (1) studies comparing the "efficiency norms" with the actual conditions of agricultural production; (2) observations of the impact on agricultural output of the withdrawal of labor from the rural areas; (3) studies imputing a marginal product of agricultural labor. In the following sections, each type of empirical study will be discussed with the emphasis on the methodologies used.

"Efficiency Norms"

The "efficiency norm" was the most frequently used approach in the 1950's. And according to Rosenstein-Rodan (57) the three

variants of the "efficiency norms" approach measure: (a) the difference between the number of labor hours required to produce a given output and the number of labor hours available from the active agrarian population; (b) the difference between the density of population deemed adequate for a given type of cultivation and the actual density of population; and (c) the difference between the number of acres or hectares required under a given type of cultivation to provide one person with a "standard income," in contrast to the size of the available agrarian population. Among these three variants, the first one, i.e., the "labor efficiency norms" approach, has been the most commonly employed.

The "labor efficiency norms" approach involves a separate estimation of the total availability of labor time and the total requirement of labor time. Factors determining these two basic elements of labor time are numerous. Some of the most important factors according to Hsieh (17) are: first, factors determining the total availability of labor time, i.e., (1) the size of the population; (2) the proportion of the population which is of working age; (3) the proportion of females to males of working age in the population; (4) the proportion of males of working age not available for productive employment in the region because of illness, absence for employment elsewhere during parts of the year, etc.; (5) the proportion of females of working age not available for productive employment in the region, because of illness, absence for employment elsewhere during part of the year, home duties, etc.; (6) the potential number of working hours per worker per day, and second, factors

governing the total requirements of labor time, i.e., (1) the quality of land; (2) climatic conditions; (3) the methods of cultivation, particularly the ratio of animal labor and mechanical power to human labor used in production; (4) the types of crops under cultivation; (5) the layout of the farm; (6) the availability of working capital; (7) the size distribution of holdings.

Some shortcomings in using this "labor efficiency norms" approach have been discussed by Dovring (7). According to Dovring, the "labor-efficiency norms" applied to the developing countries have been mostly "descriptive." In explaining this, he said, "The labor-efficiency norms communicated from the LDC's are in most cases not based on field observations of work performance under conditions such as those which would be obtained if there were no surplus. . . . The way to find realistic normative (rather than descriptive) figures is to observe work practices under circumstances where those at work have adequate incentive to do their best with the means at hand" (p. 165). Further, "descriptive" labor norms in many cases are the source of bias in estimating underemployment. Regarding this, Dovring (7) said, "Descriptive labor norms contribute to concealing the underemployment if they are upward biased. Some such bias easily comes into the picture if the norms are just descriptive, i.e., represent averages of what actually takes place, rather than reflect the norms that could be achieved under optimum conditions. . . . Upward bias may also be introduced if norms from a previous period are used as benchmark at a more recent date, when technical progress in the meantime should have lowered the labor requirements" (p. 166).

Popelasis and Topoulos's (48) inquiry on labor surplus in Greece was one of the examples in which the labor requirements were overestimated; hence their inquiry underestimated the degree of underemployment in Greek agriculture. Dovring (7), commenting on this study, wrote, "The main flaw in this inquiry is in the choice of labor norms for the benchmark year 1955. The norms used for that year are essentially the same, with no significant change, as previously reported for 1939 by another Greek writer. No one has shown whether these norms were realistic even for 1939. To maintain them unchanged for 1955 is not admissible. The basis for the conclusions about labor scarcities in Greek agriculture is not solid" (p. 166).

The Consequences of Withdrawing Labor

Estimations of the impact on output of the withdrawal of labor from agriculture has been another method used to examine the existence of underemployment. Effects of wartime shifts of population on agricultural production have been offered by observers as evidence of the existence or the non-existence of underemployment. The fall of Trinidad's sugar output which occurred during World War II at a time of rapid withdrawal of labor from the plantations led Nurkse (44) to the conclusion that ". . . in Trinidad apparently there was no disguised unemployment" (p. 34, fn. 1). Whereas according to Rosenstein-Rodan (57), "An empirical confirmation is provided by the fact that agricultural output in German-occupied Poland during the Second World War did not decrease after about

20 percent of its agricultural population was removed for drafting into the army abroad or as prisoners of war and as forced labor" (pp. 5-6). Under the wartime conditions a variety of special factors may cause increases or decreases of output quite aside from the normal effect of changes in the labor force. Findings of the existence or the non-existence of underemployment based on this kind of observation should, therefore, be considered quite inconclusive.

Schultz (61) related a reduction of India's agricultural output to an 8 percent decrease in the agricultural population of India caused by the 1918-1919 influenza epidemic. This relationship convinced him that ". . . the doctrine that a part of the labor working in agriculture in poor countries has a marginal productivity of zero . . . is a false doctrine" (p. 70). An advantage of this approach was that the influenza epidemic did not directly affect animals and the only change in the factors of production was in the number of workers.

The overall validity of this type of approach, i.e., the observations relating to the effect of the withdrawal of rural labor on rural production has been questioned. While it can be maintained that, unless the marginal productivity per worker is zero, a withdrawal of labor with everything else unchanged, results in a fall of output, the converse is not necessarily true. This viewpoint has been elaborated on by Willisz (72), "If the out-migrants do not 'take with them' their average share of farm product, the real income of the workers remaining behind rises, and it is readily conceivable that at the higher income levels the marginal utility of consumption is lower

and/or the marginal utility of leisure is higher than in the original position. The workers remaining on the farm may elect to work shorter hours and to cut down the output, even though they could have continued to produce the original output by maintaining the original work schedule" (p. 47).

Marginal Productivity of Labor

Statistical estimation of the marginal productivity of labor has been the most commonly used approach in empirical studies of underemployment. The conventional rationale for the marginal productivity of labor approach has been the consideration that zero marginal productivity of labor is the equivalent of underemployment. Accordingly, when the marginal productivity of labor is found to be zero, the existence of surplus labor is said to be verified, and when the marginal productivity of labor is found to be positive, the existence of surplus labor is said to be disproved. This kind of rationalization lost its basis in the recently developed proposition that the existence of surplus labor does not always depend on marginal productivity of labor being zero.[1] In fact, it was explained that only under a special situation is zero marginal productivity of labor a necessary (but not a sufficient) condition for the existence of surplus labor. Under such a situation Desai and Mazumdar (6) consider that the marginal productivity of labor approach can then be used as a ". . . satisfactory test of the existence

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[1]See the discussion of "Surplus Labor with Positive Marginal Productivity of Labor" in Chapter III.

of a pool of surplus labour" (p. 39). This approach involves the use of regression methods to estimate the factor-share of labor in agricultural production.

One of the difficulties of the attempts to calculate the factor-share of labor in traditional agriculture has been the problem of the specification of production functions. There are at least two factors which cause the specification problem. One is that the cultivation processes are hard to express in a realistic yet statistically manageable form; the other is that inputs, especially labor, seed, and animal power are highly intercorrelated.

Many writers have assumed a uniform production function for the aggregated data in their computation of the factor-share of labor. Their studies usually are either at the national level or at the state level. One problem of employing a uniform production function for the aggregated data is the problem of "heteroscedasticity." This is due to the fact that in most agricultural regions of the developing countries there is a wide divergence in farming practices among various groups of farms with different economic characteristics. Some widely quoted empirical studies, such as Mellor-Steven's (37), Schultz's (61), and Paglin's (47) are cited as examples of this uniform production approach. It was suggested by Desai and Mazumdar (6) that the investigation of the marginal labor productivity should be at a "disaggregate micro-level."

Most of the earlier empirical studies using the marginal productivity of labor approach use the static concept in defining "labor" as number of workers. This static interpretation of labor

has been considered by some as inappropriate. In a recent article, Desai and Mazumdar (6) strongly suggested that "labor" should be measured in terms of ". . . units of hours of work actually performed" (p. 40). The elaboration of this viewpoint can be seen in their comments on the Mellor-Steven's study (37) in which the latter concluded that marginal productivity of labor on a group of rice farms was zero. Desai and Mazumdar wrote:

> . . . the conclusion of this particular study is not acceptable. The authors measured labour in "stock" terms (i.e., in units of "bodies" of workers). . . . The Mellor-Stevens finding, even if it were valid statistically, would mean merely that farms having a higher man-land ratio did not have a higher output per acre. This may reflect no more than that the man-hours per acre were no higher because the effort supplied per worker was less on a farm with a higher man-land ratio--a possibility strongly suggested by the notion of an upward-sloping supply curve of labor. This is not the same as saying that farms with a higher man-land ratio cannot have more man-hours per acre; but a positive relationship between a higher man-land ratio and more man-hours per acre is a separate proposition whose validity has to be clearly demonstrated and not implicitly assumed. Without such a demonstration the Mellor-Stevens finding of a zero marginal product of labour, measuring labour in stock terms, is compatible with a positive marginal product of labour, measuring labour in flow terms (p. 40).

II. Case Studies

The three empirical studies are: Rosenstein-Rodan's study (57) which used the "efficiency norms" approach; Schultz's study (61) which used the "consequences of withdrawing labor approach; and Desai-Mazumdar's study (6) which used the "marginal productivity of labor" approach. Each study will be discussed and major criticisms cited.

Rosenstein-Rodan's Study

Using the approach which measures the difference between the number of labor hours required to produce a given output and the number of labor hours available from the active agrarian population, Rosenstein-Rodan (57) undertook an empirical study of underemployment in southern Italy. The static concept of underemployment which holds ". . . that amount of population in agriculture which can be removed from it without any change in the method of cultivation, without leading to any reduction in output" (p. 1) was used in this inquiry. Data for this study came from the "direct method" which was, as Rosenstein-Rodan described, ". . . based on an empirical sample inquiry with questionnaires distinguishing types of cultivation, different size and form of property, the composition of labor force, and the 'labor diagram' (number of labor hours required and supplied)" (p. 2). It was found that "more than 10 percent of the active labor force in southern Italian agriculture is surplus. . ." (p. 4).

Nine assumptions, which describe the principles and criteria for the calculation of available labor time, were made in this inquiry. A summary of these assumptions is as follows:

1. Only agricultural small holdings of "direct cultivators"--peasant owners and tenants--were considered. The assumption was that where agricultural workers are employed, these workers would not be surplus.

2. The agricultural area in this inquiry was divided into four representative types of cultivation; each of these types of cultivation was grouped into five different sizes of holdings.

3. In each of the holdings those from 14 to 65 years of age were assumed to be the active population. To calculate the labor force, coefficients of labor efficiency of men, women, and children were used for each type of cultivation, i.e., one man equals 1.0; one woman equals 0.6; one child from 14 to 18 years old equals 0.5.

4. The assumption of the availability of woman labor supply is that one woman in a household of four or less is occupied in household activities and therefore not available for work in the field. The same is assumed for two women in families of from 6 to 10 units, and for three women in families of more than 10 units.

5. It is assumed that those who are in surplus are involuntarily unemployed.

6. Labor hours required for each type of cultivation over the whole year were counted and compared with available labor hours.

7. The calculation of disguised unemployment is a process of recalculation of the number of labor units which could be removed into employment outside agriculture.

8. Three types of underemployment were distinguished: (a) removable disguised underemployment which is equal to disguised unemployment; (b) disguised fractional underemployment, i.e., labor hours not used throughout the whole year which do not add up to an entire labor unit. Persons in fractional disguised unemployment can not be moved out of agriculture; (c) seasonal underemployment due to climatic factors.

9. Those who are employed during the year for less than 51 days were assumed to be removable. This definition of removable

surplus labor which deviates slightly from the rigid static concept of underemployment was derived under the assumption that some hired labor was allowed to engage in a peak load of up to 50 working days during the year.

Rosenstein-Rodan's finding that more than 10 percent of the active labor force in southern Italian agriculture was surplus has been criticized by one writer as overestimating the degree of underemployment and yet by another as underestimating the degree of underemployment. Criticism for overestimating underemployment is found in Kenadjian's (24) statement, "When Rosenstein-Rodan observes that in southern Italy around 10 to 12 percent of the actual population in agriculture are removable, he is including among the removable surplus in the individuals who are needed for 50 days or less. If the more rigid definition, which is also the more sensible one, is adopted, the removable surplus labor is reduced to 5 percent" (p. 250).[2] The second kind of criticism, that of underestimating underemployment, was strongly stated by Dovring (7), on the basis of the labor-efficiency norms used to demonstrate the requirement of farm labor. It is said that the labor norms used in Rosenstein-Rodan's study were upward biased and hence contributed to concealing underemployment. Dovring elaborated on his arguments in this way, "The main finding was that most of the labor surplus was 'structural,' i.e., caused by seasonal variations, farm size, etc., so that only a

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[2]By a more rigid definition, Kenadjian means that the number of employment days, which is the criterion for the removal of labor, should be less than 50 days.

small part of the Italian farm labor force could be removed without causing a fall in output. The labor-efficiency level was similar to that computed by others by aid of norms kept on unpublished file by the Instituto Nazionale di Economia Agraia (INEA) in Rome. These norms reflect essentially prewar conditions, plus the significant fact of an enforced high level of labor use on large farms. . . . The norms were contrived for the purpose of concealing underemployment. . ." (pp. 166-167). Both Kenadjian's and Dovring's comments have reflected that the major problem of Rosenstein-Rodan's study was related to a lack of appropriate labor efficiency norms.

Schultz's Study

Believing that the concept of zero labor is founded on a shaky theoretical basis, Schultz (61) empirically tested that hypothesis. His concept of testing this hypothesis was approached in this manner, "A theory may appear to rest on assumptions that are far-fetched, and yet it may prove useful in explaining particular data. Thus the question is: are there data which behave as if a part of the labor force in agriculture has a marginal productivity of zero? Suppose there were a poor agricultural community from which 25 percent or less, of the labor force had been induced to leave and in which nothing else of consequence had been altered, and suppose agricultural production were to remain about constant. Such data would conform to the theory" (p. 61).

In this particular study, Schultz approached the empirical test by combining the methods of observing the effect on agricultural production with the removal of labor force and estimating the

coefficient of labor. Schultz's concept of labor was related to the number of workers. He considered that underemployment necessarily implies zero marginal labor product.

The observation of the reduction of the labor force in agriculture relates to the influenza epidemic of 1918-1919 in India. This incident was used because the epidemic struck suddenly, the death rate reached a peak within weeks, and then diminished rapidly. Those who survived were not debilitated for very long. It was estimated that for all British India the death rate for the working population in agriculture was 8.3 percent. Acreage sown in crops was taken as a proxy for the production in agriculture. Schultz estimated the existence of underemployment first by comparing the reduction in acreage sown with the reduction in the labor force. Such a comparison assumes that if any underemployment exists, the acreage sown will not be reduced as a result of sudden reduction in labor force. The acreage sown in the year 1916-1917 was taken as the base year and that of the year 1919-1920 was the test year. It was observed that the acreage sown in fact was reduced by 3.8 percent. This observation gave preliminary evidence of the non-existence of underemployment in India at the time of the epidemic.

A statistical test of two alternative hypotheses was then undertaken to confirm the preliminary evidence. These two alternative hypotheses were: "(1) The deaths had no effect on agricultural production, assuming that part of the agricultural labor force with a marginal productivity of zero was at least as large as the number of agricultural workers who died; (2) the coefficient of labor in

agricultural production in India was in the neighborhood of .4 and the elasticity of output with respect to labor was such that a 10 percent decrease in labor, holding all other inputs constant, would have resulted in a 4 percent reduction in agricultural output" (p. 66). For all British India with an 8.3 percent reduction in the agricultural labor force, the second hypothesis predicted a decrease in agricultural output of 3.3 percent. This figure is reasonably close to the observed reduction in acreage sown, i.e., 3.8 percent. The hypothesis of marginal labor productivity being zero thus was rejected. The assertion of the non-existence of underemployment in Indian agriculture at the time of the epidemic was thereby further confirmed.

Schultz's empirical test has received criticisms on a number of grounds. In commenting on the approach of the study Wellisz (72) noted:

> Even if the deaths from influenza were randomly distributed, some farms were bound to have had a large part of their labor force wiped out while others were left untouched, so that a decline in output was bound to occur prior to the restoration of an optimal distribution of workmen. Since the information is transmitted by personal contact, it is possible that some farms and some areas suffered greater losses than a random distribution would suggest. Unless we could find out what happened to the output of farms which were only slightly affected (say those which lost no more than 10 percent of their labor force) we cannot even begin to surmise whether at the margin the productivity per worker was zero or positive (p. 48).

Sen (64) has questioned the causal relationship between the reduction in production and the labor productivity as described in Schultz's study. He wrote, ". . . it seems a little difficult to take the reduction in output in 1919-1920 compared with that in 1916-1917 to be due to the operation of a positive 'labor coefficient,' rather than due to continued disease and disorder, and more importantly,

due to a family-wise and a region-wise pattern of distribution of labor reduction that followed the pattern of the epidemic, with insufficient time for adjustment" (p. 157). The relevancy of Schultz's conclusion was criticized on the basis of the timing of the data studied. It was contended by Kao, Anchel and Eicher (23) that "Since India's population grew 44 percent from 1921 to 1951 as compared with 5 percent from 1894 to 1921, the population pressures in India today are much different from those of the period studied by Schultz. Therefore, one wonders whether Schultz needs more observations from India in the post-1920 period and from other countries in the 1960's before he can conclude 'a part of the labor working in agriculture in poor countries (today) has a marginal productivity of zero . . . is a false doctrine" (p. 140).

Desai and Mazumdar's Study

Desai and Mazumdar (6) used a marginal labor productivity approach to test the hypothesis of disguised unemployment. According to the authors, the zero marginal labor productivity test was a necessary but not a sufficient test for the existence of surplus labor. The purpose of their article was to test whether this necessary condition existed. The data used in their study was at a disaggregated micro-level and was from a secondary source.[3] These data related to 99 farms of 10 villages in West Bengal State surveyed by the cost-accounting method as a part of the *Farm Management Survey*. The survey relates to the year 1956-1957.

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[3]The data were extracted from the files of the *Farm Management Survey* collected for the Government of India.

The farms were divided into two groups. Group A was formed by farms employing hired labor, Group B was formed by farms not employing hired labor. Their method was ". . . to fit a production function with identical specifications for each of the two groups" (pp. 43-44). Linear as well as loglinear production functions were used. The specifications were the following (p. 44):

Notation

q	= value of total output	
h	= man-days of hired labor	
f	= man-days of family labor	
h + f = l	= total labor input	
I	= value of major and minor implements	
G	= gross cropped acreage	
b	= hours of bullock labor	
A	= size of cultivating unit in number of acres	
(1-2)	$q/A = F^1[(l/A),(I/A),(b/A)]$	linear and double-log
(3-4)	$q/A = F^2[(l/A),(I/A),(b/A),A]$	linear and double-log
(5)	$q/A = F^3[(l/A),(I/A),(G/A)]$	double-log
(6)	$q/A = F^4[(l/A),(I/A),(G/A),A]$	double-log
(7-8)	$q = F^5[l,I,b]$	linear and double-log
(9-10)	$q = F^6[l,I,b,A]$	linear and double-log
(11)	$q = F^7[l,I,G]$	linear
(12)	$q = F^8[(l/A),(I/A),(b/A),(G/A)]$	linear

Desai and Mazumdar's analysis of the results of statistical manipulation was based on the assumption that "If there is zero marginal productivity of labour on our family farms, we would expect our sub-sample of families not employing hired labour (group B) to have a zero coefficient and the other sub-sample to have a positive coefficient" (p. 44). The results quite strongly support the hypothesis of a lower, and zero, marginal productivity of labor on farms not employing hired labor. For group B, in eight cases out of twelve the coefficient of the labor variable is not significant but negative.[4] "Thus in four out

[4]The significance of the coefficients of labor input were all tested at .05 level.

of twelve cases we can reject the hypothesis of positive marginal product of labour on these farms. Of the other eight cases six coefficients are negative but not significant. This result means that the probability of a positive marginal product on these farms is much lower than the probability of a zero or negative marginal product" (pp. 44-45). For group A, opposite results were obtained. The coefficient of labor was positive and significant in nine cases out of twelve and in the remaining three the coefficient was positive but not significant.

The major cause of the differences in marginal productivity of labor for the two groups of farms was said to be attributable to the differences in the demand for labor. The group of farms with positive marginal labor product had a significantly higher demand for labor. This is mainly due to the fact that farms in group A practiced higher intensity of cultivation such as double cropping and used more complementary factors of production such as implements.

Two rather special methods used in their study have been stressed. One was that they specified the production function in detail and varied its form to get some measure of sensitivity of their results. The other was that they separated farms on only one criterion, i.e., the employment of hired labor, to obtain separate estimates of the productivity of labor. Using these approaches together with using the data of a disaggregated type, the authors believed that "The results were free of a number of statistical problems encountered in this field of inquiry such as the use of grouped data with unequal observations, insufficient input specifications, and lack of homogeniety among observations due to geographical differences" (p. 45).

CHAPTER V

SUMMARY

Underemployment is said to exist in many densely-populated developing countries. In the preceding chapters, the concept of underemployment has been viewed from three directions--its historical perspective, its theoretical foundations, and its empirical evidence.

The historical evolution of the concept of underemployment proceeded through three stages of development. These are the stage of initial development, the stage of theory-model building, refinement, and criticism, and the stage of reexamination. In its initial development, studies in the 1930's and the 1940's revealed that a considerable degree of labor underutilization existed in various underdeveloped areas. Statistics which were presented in these studies provided the earliest evidence of the existence of surplus labor and most of the writers in this stage viewed the existence of surplus labor more as a problem to be solved than a kind of resource to be utilized for economic development.

In the second stage, covering the 1950's and the 1960's, the development of the concept of underemployment reached its peak. The idea of using surplus labor for economic development became the main subject in the discussion of underemployment. Thus literature in this period showed much optimism about development through the transfer of redundant agricultural labor to other types of work. However, by 1957 many writers severely criticized the concept of underemployment.

The assumption of zero marginal productivity of labor which was often identified with underemployment was the central issue of the controversy at this time.

During the reexamination stage the relation between surplus labor and zero marginal productivity was reconsidered. It was argued that when labor is measured in terms of hours of work instead of number of laborers, surplus labor would coexist with a positive marginal productivity of labor under an ordinary situation.

The theoretical foundations of underemployment were studied under three topics--definitions, marginal productivity of labor, and economic development by means of surplus labor. The existence and the extent of surplus labor were seen as largely a matter of definition in which different interpretations of the *ceteris paribus* conditions were assumed. Underemployment has been said to exist typically and structurally in agriculture. This phenomenon has been explained in terms of the zero marginal productivity of labor and the institutional forces that sustain it. The major explanations for this zero marginal productivity were the excess population relative to land and capital, technological restraints, cultural constraints and nutritional impediments. The commonly held identity between the existence of surplus labor and zero marginal productivity of labor lost its underpinnings when examined under the proposition that (1) the existence of surplus labor requires only the schedule of individual marginal utility from income and the schedule of individual marginal disutility from work being *flat* in the relevant region; (2) zero marginal productivity of labor is neither a necessary nor a sufficient condition for the existence

of surplus labor. Following the discussion of the major theories of economic development that center on surplus labor, criticisms were presented.

Available major post-war empirical studies of underemployment fall into three categories. These three types are: (1) studies comparing the "efficiency norms" with actual conditions of agricultural production; (2) observations of the impact on agricultural output of the withdrawal of labor from the rural areas; and (3) studies estimating a marginal productivity of agricultural labor. The "efficiency norms" approach, widely used in the 1950's, has three variants measuring (a) the difference between the number of labor hours required to produce a given output and the number of labor hours available from the active agrarian population; (b) the difference between the density of population deemed adequate for a given type of cultivation and the actual density of population; and (c) the difference between the number of acres or hectares required under a given type of cultivation to provide one person with a "standard income," in contrast to the number of available agrarian population. The shortcoming of this "efficiency norms" approach is the difficulty of establishing an appropriate set of norms. For instance, in using the "labor efficiency norms" approach, if the norms are downward biased, there will be an overestimation of surplus labor but if the norms are upward biased, there will be an underestimation of surplus labor.

The "consequences of withdrawing labor" approach often used wartime experiences as empirical observations. During wartime not only the removal of labor but also other factors affect agricultural

output. Thus, conclusions obtained from this kind of study generally are not reliable. The widely quoted Schultz's empirical study also used this "consequences of withdrawing labor" approach. The empirical observations used by Schultz were not wartime experiences but the influenza epidemic of 1917-1918 in India.

Studies estimating the marginal productivity of labor have been the most common type. Many studies of this type have used a uniform production function for macro-level data and have therefore encountered the problem of heteroscedasticity. Also, many studies of this type have measured "labor" in terms of the number of workers--a "stock" term of labor--rather than hours of work--a "flow" term of labor. A zero marginal productivity of labor derived from measuring labor in stock terms is often comparable with a positive marginal productivity of labor derived from measuring labor in flow terms.

The rationale of the marginal labor productivity approach has been that zero marginal productivity of labor is the condition for surplus labor. However, this rationale was qualified by writers such as Sen, who argued that under a situation of zero marginal productivity of labor it does not follow that there is surplus labor and that under positive marginal productivity of labor it does not follow that there is no surplus labor. Three types of empirical studies were illustrated by means of the case studies of Rosenstein-Rodan, Schultz, and Desai-Mazumdar.

Empirically, the available existing evidence gives little solid support for the underemployment hypothesis. However, at this point of time, it may be more appropriate to consider this fact as

suggesting a need for further development of methods of empirical studies rather than suggesting the conclusion that the concept of underemployment is invalid.

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VITA

Tsui-hsia Augustina Menegay was born in Taichung, Taiwan, Republic of China on June 22, 1947. She attended elementary school at Tungshi and later studied at Taichung Girls' Middle School from which she graduated in June 1965. She then entered the National Chunghsing University in September 1965 and received a Bachelor of Science degree in Agricultural Economics in June 1969. From June 1969 to September 1969 she worked with the Institute of Family Planning as a research assistant. Then, from October 1969 to March 1971, she worked as a teaching assistant for the Department of Agricultural Economics, National Chunghsing University. And from April 1971 to the present time she has been a staff member of the Institute for Community Development in Taiwan.

After six months in that position, she received a United Nations Fellowship and was sent to the United States for a Master's degree in Economics at the University of Tennessee. She graduated with that degree in December 1973.

She is married to Merle R. Menegay of Canton, Ohio.