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# Shadow Pricing and Wage and Employment Issues in National Economic Planning

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by

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This article shows how the recently refined theory and practice of shadow pricing is relevant in devising appropriate policies for meeting the recent concerns with poverty redressal and employment generation. It also demonstrates how the problems of employment and equity are related in a series of models where public policy is subject to an increasing number of political and structural constraints. It distinguishes between the long-run perspective planning problem in which the employment problem is manifested as the choice of the optimal growth rate for the economy, and short-run policy problems of dealing with various disequilibria and distortions which force the economy inside the constrained feasibility frontier, and for whose amelioration policies based on estimates of various shadow wage rates are shown to be crucial.

## I. INTRODUCTION

In recent years there has been growing concern about the problems of employment, poverty and inequality in developing countries. There is a feeling that past growth has not helped in alleviating these problems, and that a preoccupation with raising growth rates may have worsened the position of (those euphemistically described in India as) 'the weaker sections' of the population, in both absolute and relative terms.

It has also been suggested that conventional economic theory is incapable of dealing with these problems, and hence its conventional policy tools are not of much use when solutions to these problems are sought. The primary purpose of this paper is to argue heuristically against this

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view, and in particular to show how the recently refined theory and practice of shadow pricing is even more relevant in thinking clearly about these issues of poverty redressal, and employment generation. The problem I want to consider is how best a group of 'planners' concerned with problems of poverty, inequality and employment can logically think through the various policy options open to them, and derive a package of policy measures for the medium term in the form of a national economic plan.<sup>1</sup> What I want to show is that thinking about shadow prices is a good way to think about the delineation of a policy package which meets the current concerns with poverty and employment in development. In this process I would also attempt to demonstrate the ways in which these problems of equity and employment are related.

But I would like to set out by stating clearly what in my view constitutes the essence of the 'employment problem'. This is done in Section II. I then distinguish two sets of issues relating to the 'employment problem' in the context of development planning. The first set relates to the long-run issues of employment and growth to be organised within a perspective planning framework and is discussed in Section III. The other set consists of the problems arising out of short-run disequilibria which are best tackled through a medium term 'operational plan'. This latter set of issues is taken up in Section IV. A brief summary of the issues raised in this paper is given in Section V.

## II. WHAT IS THE 'EMPLOYMENT PROBLEM' ?

There has been much debate about what constitutes the 'employment problem' in developing countries. I believe there is some sort of professional consensus amongst economists that employment as such cannot be considered to be a sensible objective, but is rather a means of providing output and incomes. As within an inter-temporal social welfare framework the optimum structure of output and incomes, with given tastes, technology and political constraints, is provided by the solution to the problem of the optimal inter-temporal allocation of resources, the 'employment problem'

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<sup>1</sup> I take planning to mean the delineation of a coherent and co-ordinated set of public policies for maximizing feasible social welfare, rather than the mechanical derivation of material balances and quantity targets which have been taken to be synonymous with planning in many countries, in the past.

and policies ( in both their 'production' and 'income' aspects )<sup>2</sup> are ultimately just part of the general problem of allocating resources optimally.

The notion of 'optimality,' however, can be a slippery one, particularly in any practical situation where the nature of the binding structural and political constraints may be a matter of fine judgement and the 'optimality' of any given allocation, given these additional constraints, may therefore be controversial.

Nevertheless, in thinking about the class of issues subsumed in the so-called 'employment problem' it is useful to keep in mind the instrumental nature of employment policy within the solution of the optimal resource allocation problem for the economy. In fact, the 'employment problem' can most generally be said to be one of choosing the optimal time path of consumption for the economy, from amongst the various feasible paths. Secondly, in outlining a general framework within which the specific concerns and analyses related to labour market phenomena could be integrated, it is particularly useful to distinguish between the long-run or perspective planning problem of inter-temporal resource allocation from that relating to what I shall call the problems of short-run disequilibria. I deal with these in turn. This discussion yields a natural framework for integrating wage and employment issues within a general organizing framework of a good medium term Plan for a country.

Such a Plan would ideally attempt to sort out the policy instruments which are within the control of the planners, their 'optimal' assignment and the resulting effects on social welfare both now and in the future—the purpose being to arrive at a set of co-ordinated public policies for the medium term. This would involve indentifying technological, institutional and political constraints on the achievement of growth and distributional objectives and the delineation of strategic policies ( in particular investment and public expenditure policies, and those for suitably doctoring the price-mechanism) which would steer the economy towards its 'second-best' optimal growth path. This, of course, is a very difficult task, and very different from the mechanical solution of multi-sector economy-wide

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<sup>2</sup>There is of course Amartya Sen's [ 16 ] 'recognition' aspect of employment which though conceptually relevant in categorising some types of 'unemployment' does not seem to me to be of much operational significance, except insofar as it is a determinant of the supply prices of particular types of labour.

models with which much development planning seems to be identified. It requires fine judgement as much as analytical skill, and hence it is not surprising that there are very few instances of good plans. The breakdown of this planning problem into a long-run perspective plan and a linked but more short-term 'operational plan' is then fairly natural.

### III. LONG-RUN GROWTH AND EMPLOYMENT

Formally, the perspective planning problem concerns the determination of the optimal growth and employment path for an economy, given an intertemporal social utility function, which is to be maximized subject to resource, technological, behavioural and political constraints. This may appear too academic, but to see its practical relevance consider the following 'story'. To clarify and sort out the issues, we begin with the simplest case, of a dual economy: an economy with two sectors, one with low labour productivity and the other with high labour productivity. Initially the government is assumed to exercise complete control over the economy. The areas of governmental control are thereafter successively more and more circumscribed to show the effects this has on the optimal path of growth and employment.

The country is 'over populated' in the sense that it has reached its land frontier and hence future agricultural growth depends upon more intensive cultivation. Most of its labour force is engaged in the low productivity sector (which could include subsistence agriculture and the urban informal sector) and here average labour incomes are lower than in the high productivity sector (which could include both 'modern' agriculture as well as the industrial 'urban' sector). The projected rates of growth of population and the labour force are 'high' (say about 3% per annum). There is virtually no open unemployment, with those new entrants to the labour force unable to find 'jobs' in the high productivity modern sector being 'absorbed' in the low productivity traditional sector where the dominant mode of production permits both income and work sharing. There are clearly marked income and consumption disparities between the 'modern' and 'traditional' sectors.

We now consider what could be desirable (or 'optimal') growth path for this economy. To answer this, we need a few more details about the 'structural' and political constraints this economy faces. Let us assume that the Platonic Guardians who run this economy are willing to assign cardinal welfare

weights (based say, on a constant elasticity, additively separable social utility function of the Benthamite variety, whose arguments are based on individual utility levels) to the consumption accruing to different groups in this economy. Their aim is to maximize the socially weighted sum of consumption over time. What is the nature of the 'employment problem' this economy may face, and how can it be tackled?

As there is virtually no overt unemployment, the only meaning which can be given to the 'employment problem' is that it concerns the low productivity and incomes (sometimes referred to as the problem of 'underemployment', at others that of 'the working poor') of those in the traditional sector. The government will want to raise these incomes both for redressing poverty, as well as (given its social welfare weighting system) to reduce income disparities between the 'traditional' and 'modern' sectors. How best can it do so?

### Planning without Constraints

Abstracting initially from problems about the future, suppose the government wants to reduce the current income differentials in the country to their socially 'optimal' level. The implied transfer of income from rich 'modern' to the 'poor' traditional sector, *ceteris paribus*, will be both poverty redressing and inequality reducing. The government, *ex-hypothesi* being completely unconstrained, can achieve this income equalisation either by (i) transferring income directly from the high income modern sector recipients to the poor traditional sector, or else (ii) it can shift some of the 'capital' from the high productivity modern sector to the low productivity traditional sector, thereby lowering the average labour productivity (and incomes) in the 'modern' sector and raising them in the traditional sector. However, it is obvious that if both policies are feasible, then the second could be inefficient, for it could lead to lower aggregate output, say as a result of transferring 'capital' from the modern sector characterized by a higher fixed output to capital ratio to the traditional sector with a lower fixed output to capital ratio.<sup>3</sup> Thus the conflict between output and 'employment' in this case could only arise if the government were politically constrained not to use direct income transfer mechanisms, and if its only

<sup>3</sup>This implies that the technology in the traditional sector is inferior to that in the 'modern' sector, requiring both more capital and labour to produce the same output. There is a danger that some of the policies of investing in certain sectors—small-scale industry, rural non farm, etc.—currently part of the standard aid package, may be 'inferior' in this sense.

option in achieving its distributive aims were to use inferior techniques of production. Given the continuing references to a trade-off between output and employment in some professional circles, it is of some importance to stress that it is only by outlining and demonstrating that both these (one political<sup>4</sup> and the other technological) constraints do in fact apply in the country being considered, that this position can be sustained.

On our assumption of an unconstrained government, however, in this simple case the government could solve the 'current' poverty redressal and distribution problem by direct income transfers. In that sense it would not have any current 'employment problem'.<sup>5</sup>

With population and labour force growth, the existing 'capital' stock (including land), will be more thinly spread over the working population in both the 'traditional' and 'modern' sectors. Consequently the average labour productivity and consumption per capita in both the sectors will fall, unless the government can provide enough capital to equip new entrants in the two sectors, so that output and consumption per head remain constant in the two sectors and hence in the economy as a whole.

Moreover, if the government can provide this extra capital for the new entrants, and it can distribute the ensuing product as it chooses, then it would be optimal for it to put the incremental capital in the high productivity 'modern' sector, even though this might mean that it provides less incremental employment than if it spread this capital more evenly across the economy. Obviously, the larger the incremental capital stock, and hence incremental employment in the 'modern' sector, the higher will be output and consumption per head and the larger will be the proportion

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<sup>4</sup>In a more general model (see below) the political constraint would also have to include the inability of the government to suitably distort the price mechanism say through the use of wage subsidies.

<sup>5</sup>Moreover, if 'capital' is perfectly mobile between sectors, it would be optimal for the government to transfer capital from the low to the high productivity sector till the marginal product of capital in the two sectors was the same. More realistically, however, 'capital' once installed is likely to be non-shiftable. This is particularly true of 'land' which is likely to be the most important co-operant factor of production within the rural part of the 'traditional' sector. It should also be noted that this does not imply that there will not be a surplus of labour time in this situation, nor that there is no problem of raising productivity and hence the level of 'equal incomes'. But given the limitations of co-operant factors of production this is (as is emphasized below) not an 'employment problem' but, the usual one of a shortage of 'capital' and the ensuing problem of generating an adequate overall growth of GNP.

of the new entrants to the labour force absorbed in the high productivity modern sector. Beyond a certain level of the incremental capital stock, all the new entrants to the labour force would have been absorbed in the high productivity sector and further expansion of the modern sector (by increasing its capital stock) would obviously imply a shift of existing workers from the low to the high productivity sector. Thus alternative levels of incremental capital will imply alternative increases in future output and consumption per head, and alternative rates at which the labour force (existing and incremental) in the traditional sector can be absorbed by the high productivity 'modern' sector. The rate of capital formation, the rate of growth of output and consumption per head, and the rate of transfer of the labour force from the traditional to the modern sector, are clearly directly related.

The only sources of capital are obviously savings out of current output or else through foreign aid or investment. To make the completely unconstrained case as stark as possible, assume that some benevolent aid agency is willing to give the government enough capital, once for all, to enable it to transfer the whole of the existing (and incremental) labour force in the traditional sector to the 'modern' sector, the resulting level of the capital per worker and output/head being sufficient to generate adequate savings to equip future new entrants to the labour force with sufficient capital to keep the high productivity sector's capital per worker constant forever. Clearly, in this case there will be no 'employment problem' of any sort for the economy to face.<sup>6</sup>

#### **Planning under Political and Structural Constraints**

However, no fairy godfather exists to provide any country with capital bequests which enable it to provide both its current and future population with enough capital to enable the whole labour force to be 'employed' in the 'modern' high productivity sector instantaneously. This means that the current and future capital/labour ratio and hence (equally distributed) output per head will depend upon the amount of current and future

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<sup>6</sup>Strictly the above argument should be couched in terms of the capital/labour ratio which is required on the golden-rule path which is the maximal consumption per head steady state growth path, for any given rate of population growth and Harrod neutral technical progress. As is well known, the golden-rule capital/labour ratio is obtained by equating the marginal product of capital to the natural rate of growth (which in turn is the sum of the rate of population growth and labour augmenting technical progress).

savings the government is willing or able to squeeze out of current and future output. This immediately forces the government to examine the familiar and well-known trade-off between 'employment and growth'.

Continuing with our 'story', the government is now 'constrained' by the need to generate enough domestic savings to raise the aggregate capital to labour and output per head ratios of the economy. It can only do so by cutting (*ex-hypothesi*) equally distributed consumption. Suppose, it chooses not to do so beyond the level which is enough to maintain the current capital stock in both sectors intact. In that case, current workers will enjoy the maximum level of consumption that is feasible, given the country's resources and technology, without actually running down the existing capital stock, (and given the initial allocation of non-shiftable 'capital' between the two sectors). However, this will mean that with population and labour force growth, even in this otherwise unconstrained case, the capital per worker in the two sectors and hence output and consumption per head in future will be lower than that of the current population. As a result, even though everyone in the future has the same income (given our "perfect intratemporal distributional control" assumption), and *ex-hypothesi* no one is overtly unemployed, there is in a sense an 'employment problem', viz., a trade-off between the levels of current and future per capita consumption. Some of the mechanical manpower projection models capture this aspect of the problem by simulating the labour slack which would exist if the labour capital ratio was fixed for the economy. Within such a framework, and with no growth in the capital stock, the new entrants to the labour force would clearly, in this case, be redundant.

Obviously, the greater the savings flowing from the reduction of current (equalised) living standards that the government can squeeze out, the higher the capital and output per head it can achieve in the future. The optimal level of savings will, therefore, depend upon the relative weight the government attaches to the consumption of current and future generations. Given the initial conditions, the exogenously determined rate of growth of population and its intertemporal social valuation function, a simple optimal growth model can be set up, which would yield the welfare maximising optimal path of consumption per head and savings, till all the labour force has a productivity level corresponding to that in the current high productivity 'modern' sector. Thus, at the time the economy as a whole has achieved productivity (and income) levels of the current 'modern' sector, there will in a sense be no 'employment problem' of any kind. Clearly one question that can be usefully asked is how long it would take (T) for a

country constrained only by its initial conditions, population growth rate, current and future technology, and some lower subsistence income bound on the consumption per head, to attain current levels of modern sector-productivity, in all the sectors in the economy, assuming some plausible range for the parameters of the social utility function. (If this is of the constant elasticity type, this parametric variation would consist of estimating  $T$  for alternative values of  $e=1, 2, 3$ .) Some rough and ready estimates of  $T$ , would provide a useful indication of how long on the most optimistic assumptions, it would take a country, relying on its own resources and following optimal policies, to eliminate the employment problem in every sense.<sup>7</sup>

No government, however, benevolent or powerful, is likely to be merely constrained by the initial conditions and the given rate of growth of population. In particular the assumption that the government can legislate whatever income distribution it chooses at a point in time, as well as what it considers to be the optimal savings rate (or intergenerational income distribution) is clearly unrealistic. The ensuing constraints are best viewed as political constraints and their implications for the optimal development of so-called labour-surplus economies have been extensively studied in the development literature<sup>8</sup>. Here country specific information about the nature of the constraints will be important in delineating the appropriate long-run development 'optimal growth' path for the economy. It may be useful in clarifying the underlying ideas, and their relationship to the 'employment problem', to briefly outline, the commonest form of such a politically constrained optimal growth model.

We now assume that the government cannot directly transfer income to the 'poor' because of the lack of any feasible transfer mechanism. Secondly, the only instrument available to it to raise the income of the poor is to employ them in the high productivity 'modern' sector. However, thirdly, either the supply price of workers to the modern sector is greater than the value of their alternative marginal product in the traditional sector, or else there is an institutionally fixed wage in the urban sector which is above the supply price (which is equal to the marginal product) of workers from the traditional sector. Assessing the validity of these assumptions and their quantitative significance, should obviously be

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<sup>7</sup> $T$  corresponds to the date (in the project evaluation literature) when the shadow price of investment in terms of consumption becomes unity.

<sup>8</sup>See [ 1 ; 2 ; 3 ; 4 ; 10 ; 11 ; 13 ; 14 ; 17 ].

an important part of any attempt to deal with wage and employment issues in economic planning for a country where this type of model may seem applicable.

Suppose they do hold. Then it is well-known that the government faces a further dilemma, that its attempt to improve the conditions of the poor today, by increasing modern sector employment, directly entails increased current aggregate consumption, which is at the expense of future growth and employment. The government now has to weigh the impact of any attempts to increase industrial employment, on both the current distribution of consumption, as well as on the intergenerational distribution. Clearly, given its social valuation function, on this politically constrained optimal growth path, these weights on intra-and inter-temporal distribution must be consistent. Again an optimal growth model for such a two-sector economy can be set up and numerically solved for alternative parameter values of the social utility function, etc., to yield the time  $T'$  by when the employment problem in all its manifestations would be eliminated by following 'second best' optimal policies given the political constraints. From the same model (which can be approximate, as it is really only important to get some rough idea of the magnitudes involved), estimates of 'national parameters' which are required for investment appraisal, such as the accounting rate of interest, and the 'industrial' shadow wage rate can be derived. Apart from their use in investment appraisal, these estimates of national parameters would be useful in analysing various prices and public expenditure policies which have a distributive impact. Also the important current critical consumption level at which income transfers are as equally valuable socially as the numeraire for social accounting (say, public savings), and on which the current distributional weighting system depends, would be determined.

Given the recent emphasis on programmes for various poverty groups, the derivation of the critical consumption level is of some importance in assessing these programmes. For this level will not in general be identical with some national poverty line. The reason for this can be seen in terms of our above arguments on 'employment and growth'. For as its name suggests the critical consumption level is that consumption level at which consumption transfers are socially as valuable as savings, with transfers to those below (above) it being even more (less) socially valuable. If a large part of the population is below some national poverty line, and the critical consumption level is identified with it, then this will imply that increasing the current consumption of a majority of the

population is socially more valuable than savings and growth. Given our earlier argument, however, it is unlikely that in such countries future consumption (and growth) can be discounted so heavily, and hence the critical consumption level will most likely be less than the poverty line.<sup>9</sup> The resulting judgements on the socially desirable level and coverage of poverty programmes will therefore differ, with differing judgements about the critical consumption level.

For the framework of national planning, moreover, estimates of  $T$  and  $T'$  would provide some meaningful measure of the seriousness of the employment problem even if otherwise optimal policies are followed. The discussion of required capital inflows could also then be sensibly related to the question of the impact of alternative feasible levels of such inflows in shortening  $T'$ .

Various other public expenditure decisions, could also be thought through in this framework. For instance, if some forms of direct income or consumption transfers (for instance, through nutrition programmes) to the poor are considered to be feasible, either their 'optimal' level (given assumptions about the politically constrained size of the government budget) or else, the effects of any given level of such transfers on  $T'$  could be estimated.

The end result of adopting some such perspective planning framework which integrates the growth and employment aspects of long-run development in a consistent welfare economics framework would provide both some quantitative feel for the feasible limits of current and future poverty redressal, as well as the trade-offs between them, given judgements about existing and likely future political and structural constraints.

#### IV. SHORT-RUN DISEQUILIBRIA, LABOUR MARKET STRUCTURE AND THE REAL COST OF LABOUR

The above discussion of the perspective planning problem assumed that the economy would otherwise be operating optimally given the absolutely binding political and structural constraints. In practice this assumption is unlikely to be valid. There are likely to be various distortions,<sup>10</sup> some of which may be policy induced, which will prevent the economy from

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<sup>9</sup>For actual numerical experiments for India see [9].

<sup>10</sup>The term 'distortions' is a useful short-hand expression to describe a host of considerations which cause divergences between the marginal social costs (MSC's) and marginal social values (MSV's) of different goods and services in the economy. For an economy at its optimum  $MSC=MSV$  for all goods and services.

doing as well as it could, even given the binding political and structural constraints. That is, the economy may be inside its feasible second best production possibility set. A heuristic discussion of this point is contained in the Appendix.

Much of the actual art of planning consists of delineating the reasons why a particular economy is not on its 'second best' feasibility set and outlining policy measures which may put it on this feasible frontier. Such policy changes could lead to both greater current employment (consumption) and growth (investment). These class of issues can be contrasted with those which essentially concern choosing the optimum point on the constrained production possibility set and hence involve, in its simplest form, the trade-off between current employment and growth.

In addition, it will be important to assess and analyse the structure of labour markets in the countries concerned. There are two ways in which analyses of labour market structure could be both improved and integrated into an overall Plan framework.

The first stems from the obvious inter-relationship between the specific labour market structure of any country and the structural specification of a simple (say, two-sector) optimal growth model which allows social choices relating to growth, employment and distribution to be integrated within a consistent inter-temporal perspective planning framework. Thus for instance, in the simplest of these models, those concerned with a labour surplus dual economy, it will be important to know the reasons why there is an inter-sectoral 'wage' (income) differential between the modern and traditional sectors, its size in real terms, and how depending upon both individual or household behaviour in the two sectors as well as their respective production relationships, this differential is likely to evolve over time.

But, this in turn will require some knowledge and analysis of the modern and traditional sector labour markets (including their more important sub-markets) and their inter-relationships. The analysis of these labour markets, is best done in an explicit demand and supply framework. However, in determining the supply of labour markets, it is not sufficient to look at the stock of labour time available from the labour force specifically assigned to that sector on the basis of past labour force surveys, as seems to be the usual practice. It is equally important to assess the likely spillover effects of any change in labour demand conditions in the particular market, on other linked markets. In many economies it may also be particularly important to disaggregate labour supply, spatially, and to take into account the resulting migration flows between different

geographical markets. A rough and ready estimate of the resulting elasticity of labour supply with respect to the wage rate in the major labour markets would thus be an important magnitude, as it would enable some rough quantitative estimate to be made of the likely distributional effects of increasing labour demand in particular sectors. Ideally, estimates of 'short' and 'long' run elasticities should be differentiated. But even some qualitative judgement of the difference between them would be useful.

In the analysis of these labour markets, outlining institutional and structural features, such as differing modes of production in different sectors, will be extremely important. For instance, in rural (particularly agricultural) labour markets the distribution of land and the land tenure system, together with the cropping pattern, and the relative importance of hired as compared with own family labour in different farm operations would be important determinants of the supply price of labour both within and (through migration) to other sectors in the economy. Some rough and ready estimates or at least qualitative judgements of these supply curves of rural labour are again necessary if the distributional impact of increased demand (direct or indirect) for rural labour via the resulting changes in real wages, is to be determined.

In some countries the wage-determination process might be dominated by administered wages in some parts of the 'modern' sector. It may be impossible to expect that this 'structural' feature could be removed, in which case it might have to be accepted as yet another 'political' constraint. Similarly, the role of 'minimum' wages on the supply and demand for labour may be important, and will need to be assessed. Thus the implications for the supply of labour and relative (as well as absolute) wage movements resulting from changing labour demand in alternative sectors will have to be thought through, and again if data availabilities permit, quantified.

The upshot of this is that after delineating the more important labour markets in the economy, their inter-relationships and the existing structure of relative real wages in the economy, it is important to form some judgement on the wage (income) determination process in the various labour markets, which in turn involves forming judgements on the relevant supply and demand curves of labour in the various labour markets.

It is particularly important to concentrate on the relevant supply curves of labour in different labour markets partly because of the relative neglect of this aspect in most national plans (which at best tend to adopt a mechanical 'stock' of labour time definition of labour supply),

and also because in an important sense whereas the demand for labour (either in aggregate or in different sectors) is within the government's control through its investment and public expenditure policies, the supply of labour (except in slave economies) is not within its control. As the distributive ('employment') effects of alternative labour demand increasing (via investment) policies will depend upon the interaction of the incremental demand and supply of labour, it is extremely important to know at least the shape of the supply curves of labour in the different sectors (or sub-sectors). Having said this, the actual analysis of labour markets and the determinants of the labour supply and demand curves in different economies will involve country specific information, fine judgement, and imagination. Clearly it would be impossible and undesirable to lay down a specific checklist or guidelines for such labour market analysis for the varied countries classified as developing.

However, there is one organizing framework within which the aspects of the labour market, particularly those relating to the supply curves of labour, can be integrated, and which if followed consistently across countries would force the country economists concerned to think through and quantify some of the aspects of labour markets which are relevant for policy purposes. This is the shadow wage rate framework of project analysis. It is relevant and useful as a framework for organizing the labour market discussions in national planning for two important reasons.

First, as we have emphasized, the important structural features of a particular country's labour markets, for which some feeling is required in thinking about the long run growth and employment prospects of a particular country, relates to the supply side of the labour market and the process of wage determination. Secondly, in the most general sense, the employment problem both in its resource utilization and distributional aspects, is a problem of differential real costs of labour in different sectors, which moreover do not equal the relevant market wages in all the sectors. The real cost of labour consists of the sum of the social cost of the output foregone by shifting a marginal unit of labour from one occupation to the next plus the net social cost of the consumption changes flowing from any such shift of labour, and which takes account of the effects of these consumption changes on both inter and intra-temporal income distribution. The shadow wage rate (SWR) is nothing else but this real cost of labour. Estimates of relative SWR's for different sectors or in particular labour markets, therefore provide an important indication of areas where specific investment are likely to

make the greatest impact on growth and distribution. As apart from measures which improve the overall efficiency of the economy (on which more below) and which thus enable it to operate on (or close to) its structurally and politically constrained production feasibility frontier, the other major policy instrument available to a government is its deployment of investment and public expenditure in the economy. For determining this 'optimal' investment programme which takes account systematically of both growth and distributional (employment) objectives, subject to given structural and political constraints, some notion of relative social rates of return in different sectors is required, and to form judgements on these some idea of the relative SWR's in the sectors is necessary.

It seems to me that an important way to organize the discussion of the structure and functioning of labour markets in national planning is thus within the framework of SWR estimation. This would require estimates of real sectoral income (wage) differentials, and sectoral real consumption levels, plus the sources and supply prices of labour drawn from within and from inter-related sectors as a result of an increase in the demand for labour in the particular sector.

It may be useful to see the specific aspects of labour markets which such a framework would require to be analysed in national planning. Confining ourselves to two sectors, but using an argument which can be generalized to many sectors, consider an economy depicted by Figure 1.<sup>11</sup> It has two sectors labelled I and II, and for simplicity we (initially) ignore the possibility of unemployment in the two sectors, and also assume that the wage rate is the same ( $W$ ) in both the sectors (neither of the two assumptions is essential to the argument but simplifies the exposition). The demand curves for labour in the two sectors are  $D_I$  and  $D_{II}$ , and the initial labour allocation between the two sectors is  $EL_I$  in sector I and  $EL_{II}$  in sector II, with the common wage  $W$ . Suppose the effective supply curve of labour from sector II to sector I is greater than the wage (equal to the marginal product) in Sector I, because of various imperfections like those in information flows, various psychic disutilities and real resource costs of moving from one sector to another. If sector II is rural and I is urban, then the difference between the supply price and marginal product of rural labour will also depend upon various institutional features such as the relative proportions of landless and landed peasants, the extent of pure family labour operated

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<sup>11</sup> This is due to Scott [ 15 ].

farms, the land tenure system etc. The resulting supply curve of sector II labour to sector I is then given by  $S_{II}^2$  in Figure 1. Suppose that there is an increase in demand for labour in sector I of  $E_I E_{II}$ . This will raise the wage-rates in both the sectors. In the new equilibrium the sector I wage will have risen to  $WW'$ ; at this wage given the  $S_{II}$  supply curve of labour,  $EE_{II}$  workers will move from sector II to sector I, and the wage in sector II will rise to  $WW''$  (and there will now be a wage differential between the two sectors). The increased demand of  $E_I E_{II}$  of labour in sector I will thus be met from a transfer of  $EE_{II}$  from sector I who are 'obtained' by the bidding up of sector I wages. These proportions and the accompanying changes in sectoral wages obviously depend upon the initial allocation of the labour force between the two sectors, the elasticities of labour demand in the two sectors, and on the elasticity of labour supply from sector II and I.<sup>12</sup> Thus to assess the consumption and output changes which result from increasing labour demand in sector I, which are required for SWR estimation, we need some rough estimates of these elasticities. This argument can be extended to cover a number of sectors, one of which could be a 'sector' of open unemployment, and could also include sectors where wages are administered ('institutionally given'). For estimating particular sectoral SWR's it would be necessary to estimate the proportions in which labour would be drawn from various other sectors if labour demand in a given sector were increased, and this (as the above simple model shows) would entail an analysis of the major labour market issues—wage structure, changes in 'unemployment', migration etc.—that would be of interest in deriving employment oriented Plans.

#### Incorporating Other Labour Market Issues within the Proposed Framework

Are there aspects of the recent concern with poverty and employment in Plans impinging on labour market phenomena, which the above framework would not be able to include?

*Prima facie*, there are two types of discussion which are common to many national Plans, which we have not mentioned explicitly, and which might be thought have been excluded from our discussion. One is the measurement and interpretation of rates and levels of unemployment, the

<sup>12</sup>The ratio  $E_I E / E_{II} E = E_I E \times \frac{WW'}{E_{II} E} = \frac{\text{Slope of } D_I}{\text{Slope of } S_{II}}$

$$= \frac{E_L \cdot e}{I \cdot dI} \times \frac{W}{E_{II} \cdot e_{s_{II}}} \quad (\text{assuming that } D_I \text{ and } S_{II} \text{ are straight lines and where the } e\text{'s are elasticities of demand and supply}).$$

$$= E_{L \cdot e_{dI}} / E_{L \cdot e_{s_{II}}}$$

other is the discussion of the appropriate development of different skill levels through the educational system. We deal with these in turn.

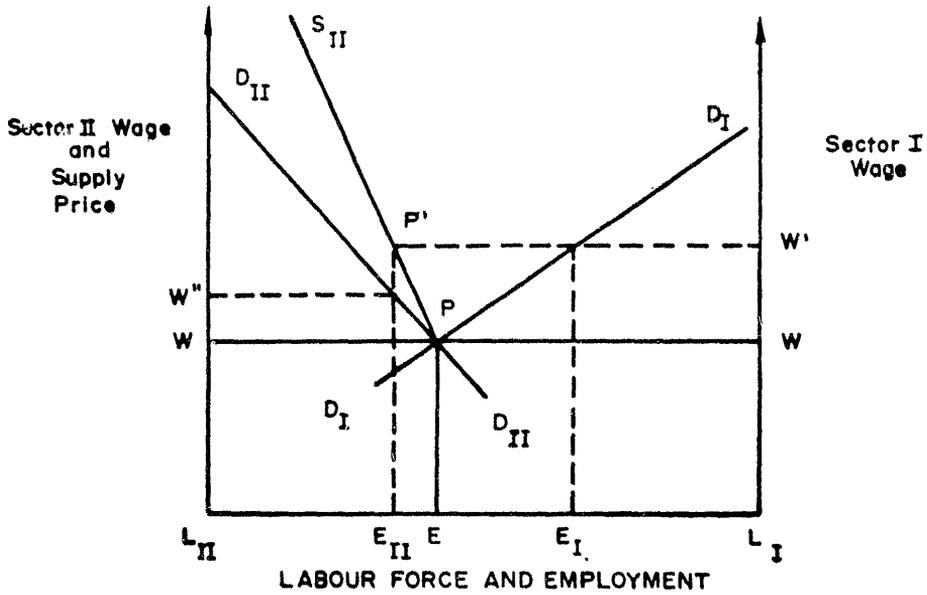


Figure 1

**Unemployment—Measurement and Interpretation**

Most national Plans increasingly present some measures of 'unemployment', but the concept of 'unemployment' seems to vary from measures of open unemployment, to those of 'underemployment', to those of the poor (classified on the basis of some minimum nutritional standards). Raj Krishna

[6] has recently tried to relate the varied unemployment measures which are most commonly derived (or are derivable) in developing countries, in terms of varying intersections of three general sets of 'people': those who are idle, those who are willing to work more, and those who are poor. Thus the openly unemployed are idle and willing, but not necessarily poor; the underemployed are usually poor and willing but not necessarily idle, whilst the poor may be neither idle nor willing (or able) to work more. There is something to be said for adopting this common framework for measures of unemployment, for it would at least entail that the particular numbers generated would have a clear and unambiguous meaning and could be meaningfully compared across countries.

More importantly, the distinction between the idle, willing and poor, helps to integrate the alternative measures of unemployment into the proposed analytical framework for national planning. A delineation of relative income (wage) levels in various sectors of the economy, which is required both within the SWR framework, as well as to provide some of the structural stylized facts for thinking about alternative long-run development paths for the economy, would obviously also provide an index of 'the poor'. But more importantly, this index would now be meaningfully integrated into a framework from which both long-run and short to medium term policy decisions could be derived.

Similarly the estimates of the underemployed—the willing and poor (the working poor)—too would be integrated in the type of 'dual' economy type labour market analysis of the long-run development of the economy. The implications of such an economic structure for both alleviating poverty and removing these dualistic features over time for alternative long-run development paths, as well as the relevant policy package in the near future which takes account of both growth and distribution, would need to be explicitly faced within the proposed organizing framework for national economic planning.

This leaves the interpretation and integration of measures of open unemployment within our organizing framework. The proposed SWR framework, within which open unemployment is treated as a 'separate sector', would necessitate an analysis of the causes of open unemployment, how it is financed, the characteristics of the unemployment—in particular of their supply prices, and most importantly of the effects of alternative levels and mixes of increased labour demand on the 'size' of this sector. This would

be a considerable advance, in my view, over the current treatment of open unemployment, in countries where it poses a serious problem.

### **Education**

The treatment of educational issues relating to labour markets are unfortunately rather mechanistic in most national economic Plans. The basic analytical approach which commonly underlies this treatment is a manpower forecasting type approach, and is particularly evident in a common prescription for expanding non-formal education. However, there are serious objections to this type of approach,<sup>13</sup> which implicitly assumes that there are particular required characteristics for every job or occupation which can be imparted (as in particular machines) to individuals by the educational system, and that there are 'imbalances' in particular labour markets when the supply of people with particular educational characteristics does not match the given demand for them. This mechanistic approach which does not take account of or explain the adjustment mechanism whereby such 'imbalances' would be 'cured' by changes in the relative wage-structure, then ends up by trying to attain 'equilibrium' by regulating the supply via different patterns of educational expenditure.

A more useful framework for thinking about educational policy would be in terms of the relative private and social rates of return (to different levels of education) and divergences between them. Moreover an analysis in terms of relative private and social rates of return would fit naturally within our proposed framework. These rates of return should depend upon explicit labour market variables and judgements about relative current and future demand and supply in markets for different types of skills, and the resultant effects on relative wages. Also analyses of the sources of divergence between private and social rates of return and of social returns for different types of educational attainment would enable appropriate educational policies to be designed for the 'optimum' pattern of educational expenditure. This would, in my view, be more useful than the prescriptions normally derived from mechanistic manpower projection models.

### **V. SUMMARY AND CONCLUSIONS**

There is essentially a three-stage process which underlies the proposed analytical framework for integrating growth, employment and distributional issues in national economic planning. Heuristically, the first stage can be said to consist of delineating the technological possibility frontier between

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<sup>13</sup>See [ 5, pp. 320-321 ].

present and future consumption (given optimal policies, and no other constraints apart from those of technology, initial resources and given demographic trends). Even then, there is likely to be a conflict between growth (which will determine future consumption) and current employment (which will be determined by the choice of the current level of consumption).<sup>14</sup> The optimal consumption and employment path on this technological possibility frontier may be worth assessing either in terms of fairly simply numerical optimal growth models,<sup>15</sup> or at least in terms of some qualitative judgements about the time it would take for the whole of the working population to achieve average productivity (and income) levels in the current high productivity 'modern' sector if these ideal conditions existed. This would at least provide some sort of upper bound to one's optimism about how soon 'poverty can be eliminated'.

Clearly however, no economy operates on its technological possibility frontier. There are numerous other constraints of a structural and/or political kind, which entail a 'second-best' feasibility frontier, which is the relevant one for any policy purpose. Delineating this feasibility frontier is in part dependent upon judgements about the binding structural and political constraints the economy faces. Some of these constraints may be policy induced, but if for whatever reason there is no likelihood of the government's altering these particular policies, they may have to be accepted as binding constraints. The real art of good economic planning would presumably lie in forming these rather difficult judgements about what in fact are binding feasibility constraints, and hence which of the seeming feasibility constraints can in fact be shifted by persuasion and policies.

If some idea of this feasibility frontier is available, then again a 'second-best' optimal growth path can be calculated, though clearly if a formal optimal growth model is to be solved numerically, it may only be feasible to incorporate the most important of these constraints into say a two-sector model. The feasibility constraints most often incorporated in such models are a 'modern sector' institutional wage above the supply price or marginal product of labour in the traditional sector, and the inability of the government to control the consumption out of wages. Other constraints

<sup>14</sup>For even in this case the problem of employment (distribution) and investment (growth) will be inter-related if the labour force is greater than can be employed (with existing resources and technology) till the point where the marginal product of labour is equal to the subsistence wage rate.

<sup>15</sup>See [10;14] for some such models and [13] for a lucid discussion of the use of optimal growth models in perspective planning and their link to the concerns of project evaluation.

may be more important in other economies, but it is useful to think through their implications either within a formal numerical optimal growth framework, or else in a more heuristic framework (see for instance [12, chapters 13 and 14] for the date by when there is likely to be no employment problem (savings and consumption are equally valuable), and the resulting weights which should be attached to growth and employment (investment and consumption) over time on alternative assumptions about the elasticity of social marginal utility. These estimates of national parameters are also required for project analysis, which hopefully will increasingly form the basis for making public sector investment decisions in most developing countries.

More importantly however, this approximate delineation of the feasibility constraints should enable the two tasks under the third stage of the process to be completed. The first of these arises from examining to what extent the economy is operating within its feasibility frontier, due to the existence of various 'distortions' which are not part of the feasibility constraints and which could and hence should be corrected. Various policies for correcting these distortions would yield both more growth and employment, and put the economy on its feasibility frontier where alone the trade-off between the two 'objectives' needs to be faced. Much of the discussion in national Plans of tariff, exchange rate and price policies, which enable an economy functioning inefficiently within its feasibility frontier to function more efficiently and move towards this frontier, would clearly fall into place in this context.

The second task, which covers the remaining area of policy formulation in a national Plan, is essentially to determine the 'second-best' 'optimal' investment and public-expenditure programme of the government. This generally involves some assessment, qualitative or quantitative, of relative sectoral social rates of return. In forming these judgements some notion (implicit or explicit) of the sectoral real costs of labour (in other words of the SWR's) is indispensable. To obtain some idea of sectoral SWR's, some judgements on the supply curves (and labour demand elasticities) for the relevant type of labour is required. This in turn requires the analysis of the major labour markets, their inter-relationships, wage determination processes and the structure of income and consumption levels.

Finally, it should be emphasized that this framework is essentially a way of thinking about particular policy issues, and does not entail that for every country mechanical numerical multi-sector models be set up and solved. However, clearly, some quantification of what are considered to be the crucial and relevant relationships would be indispensable.

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**Note:** The above diagram (from [13]) illustrates the relationship between growth and employment and the importance of distinguishing between 'possibility' and 'feasibility' frontiers—where the latter include various 'political' or 'structural' constraints. For simplicity we look at an one-good economy with a given initial capital stock ( $K_0$ ), and labour force  $OL^*$ . In the left hand quadrant of Figure 1,  $OY$  is the resulting neo-classical production function which shows current output as dependent only on the labour utilized (given the fixed current capital stock  $K$ ). If the government has complete control over the economy, and can legislate both the wage-rate and the investment-consumption mix for the economy, then it should clearly maximize current output and employment (given by  $Y^*$  and  $L^*$  respectively). If the labour force ( $L^*$ ) is smaller than the level at which the marginal product of labour (with given  $K_0$ ) falls to zero, this optimal policy will also yield full employment. Moreover the resulting frontier between current consumption and investment can be depicted by  $T_1T_1$  in the right hand quadrant of Figure 1. Clearly, the slope of  $T_1T_1$  will be  $-1$ .

Next, suppose the government, whilst still being able to choose whatever consumption-savings balance it wishes, is nevertheless constrained to pay a fixed wage of  $W$  for labour. The maximum amount of employment (and output) that can then be provided is  $OL_1$ , and the corresponding 'constrained' consumption-investment frontier will be  $T_2T_2$ , but which will still have a slope of  $-1$  (as *ex-hypothesis*, the government can choose whatever consumption-investment mix it desires).

We constrain the situation further, by assuming that in addition to paying a fixed wage-rate, the government cannot directly control the savings-consumption balance in the economy, which is now determined by the share of wages (assumed for simplicity to be all consumed) and profits (assumed to be all saved) in total output. Thus if  $OL_0$  are employed with the current capital stock  $K_0$ , total output is  $L_0Y_0$ , of which  $C_0L_0$  has to be paid in wages and will be consumed, and the remainder  $Y_0C_0$  will be saved and invested ( $T_3P=Y_0C_0$ ). As drawn it can be seen that  $OL_0$  will yield the maximum level of investment that is attainable, and  $P$  will represent the corresponding consumption-investment mix in the economy. As employment is increased, the feasibility frontier between consumption and investment will be of the  $T_2P$  shape (which will lie within  $T_2T_2$ ). The efficient feasibility frontier (between consumption and investment) for the economy subject to the above two constraints will thus be  $T_2P$  (it will not be efficient to be on the  $OP$  section of the frontier that is to have employment less than  $OL_0$  as this reduces both consumption and investment). This structural-cum-politically constrained feasibility frontier clearly will lie within the 'unconstrained' feasibility frontier  $T_1T_1$ , and the 'structurally constrained' frontier  $T_2T_2$ . The optimal level of employment and growth will then be determined by the relative social valuation of consumption and investment, which will determine the optimal point on the  $PT_2$  feasibility frontier.

Finally the economy may not be operating efficiently on its constrained feasibility frontier. It may be at a point such as  $\bar{Y}$  in employment-output space, and the corresponding point  $\bar{P}$ , (in consumption-investment space) which is within the feasibility frontier  $T_2P$ . Clearly policies which put the economy on this frontier could achieve both more consumption and investment (or employment and output).

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