THE OPTIMAL EMPLOYMENT LEVEL, THE NEGATIVE INCOME TAX AND AN ALTERNATIVE SUGGESTION

by

Dean A. Worcester, Jr.

THE OPTIMAL EMPLOYMENT LEVEL, THE NEGATIVE INCOME TAX
AND AN ALTERNATIVE SUGGESTION

by

Dean A. Worcester, Jr.[*]

The chief aim of this paper is to show that an un-
recognized externality exists in important labor markets which
makes optimal employment unprofitable under competitive con-
ditions. The second section analyzes the potential of the
negative income tax to expand employment to an optimal level.
The third section offers a more promising alternative.

I. An Explanation of Secular Unemployment

The present analysis abstracts from short term fluc-
tuations and growth because the matter under consideration is
seen as a chronic tendency to underemploy labor. It also as-
sumes the absence of indivisibilities, monopoly, imperfect
capital markets, ill-behaved functions, and imperfect monetary
and fiscal policies. No one is involuntarily unemployed under
these circumstances. Nevertheless unemployment exists in the
sense that a market economy does not enjoy a pareto-optimum
equilibrium of employment or output because of an externality
in the labor market which is quite different from those associ-
ated with the manpower development programs of recent years.[1]

For convenience, divide the population into two ca-
tegories, the labor force and the unemployed. All of the labor
force is employed according to the definition in the preceding

paragraph because all of the unemployed prefer unemployment to employment at prevailing competitive wage and price levels.

The unemployed are, nevertheless, consumers. In no economy are the unemployed denied food, clothing or shelter. In some cases, they fully support themselves out of past savings and investments, but most are supported by transfers from current producers.

This support is not the result of coercion. Rather it is part of the preference structure of the employed workers. In some instances the transfers can be rationalized as intra-family consumption and investment activity. The family group wish to educate their children, have the wives busy in their homes at least while the children are young, and to maintain aged and/or infirm members of their families in comfort. This supports, at least for statistical purposes, the aforementioned in their unemployed status. Substantial inter-family transfers are also made, some privately and more through government.

We assume that these transfers reflect the desire of the employed (however roughly and imperfectly) to support others in need. It is logical to assume that they view the transfer as costly so that if the need were less they would attain a higher preference level by transferring a smaller proportion of their incomes.

Consider now the position of those who receive the

transfers. They are given a choice between the incomes that they can earn and the transfers available if they do not work. They find the latter to be preferable. Figure 1 illustrates the alternatives before three different workers who happen to share the same preferences between the utility of goods and the disutility of work (the utility of leisure). The indifference curve TI displays their preference between annual income, shown on the vertical axis, and hours worked per year, shown on the horizontal axis. An individual who does not work receives a transfer payment equal to OT. The three individuals have quite different income-earning potentials shown by the total income lines OO_1, OA_1, and OM_1, for workers O, A and M respectively. Worker M is a marginal worker in the sense that, as indifference curve TI shows, he is equally content to work Hm hours for an income of HmM' or to remain unemployed while receiving a trans- fer income of OT. We assume that as chance has it he is not working presently.

A trifling side payment or wage subsidy would lead M to prefer work. Should he so choose, virtually the whole trans- fer payment, OT, could be restored to those who preferred to provide the transfer payment when he was unemployed. Since this gain is not accompanied by any loss to M it is possible to achieve a welfare gain equal to the former transfer payment. Specifically, the private cost of hiring such a person as M for Hm hours is his full wage, HmM', but the social cost is only

the difference between his full wage and his transfer income, HmT'. Thus, his marginal productivity must be greater by T'M' than his social cost if he is to be employed, and a welfare gain of T'M' is achieved if he chooses employment.

Others not presently in the labor force can be induced to take productive employment by larger sidepayments. The optimal level of employment is not reached until the required sidepayment is equal to the cost of maintaining the worker in unemployed status.

If perfect information and costless negotiation existed, the employed workers would surely induce the marginal worker to take a job. This is not a practical possibility where the transfers are affected through large centralized agencies.[2] In the absence of such negotiation the competitive "full employment" equilibrium is not a pareto-optimum.

Many people will remain outside of the labor force even if all externalities are removed. These include those whos marginal rate of substitution between work and income is equal to or greater than their wage rate when they work zero hours. Individual 0, whose income line in Figure 1 is 00_1, is a marginal member of the labor force in the absence of externalities. This is shown by the fact that if he were to continue to receive the full transfer payment in addition to any income that he can receive from working his income possibility line becomes TTo

Figure 1
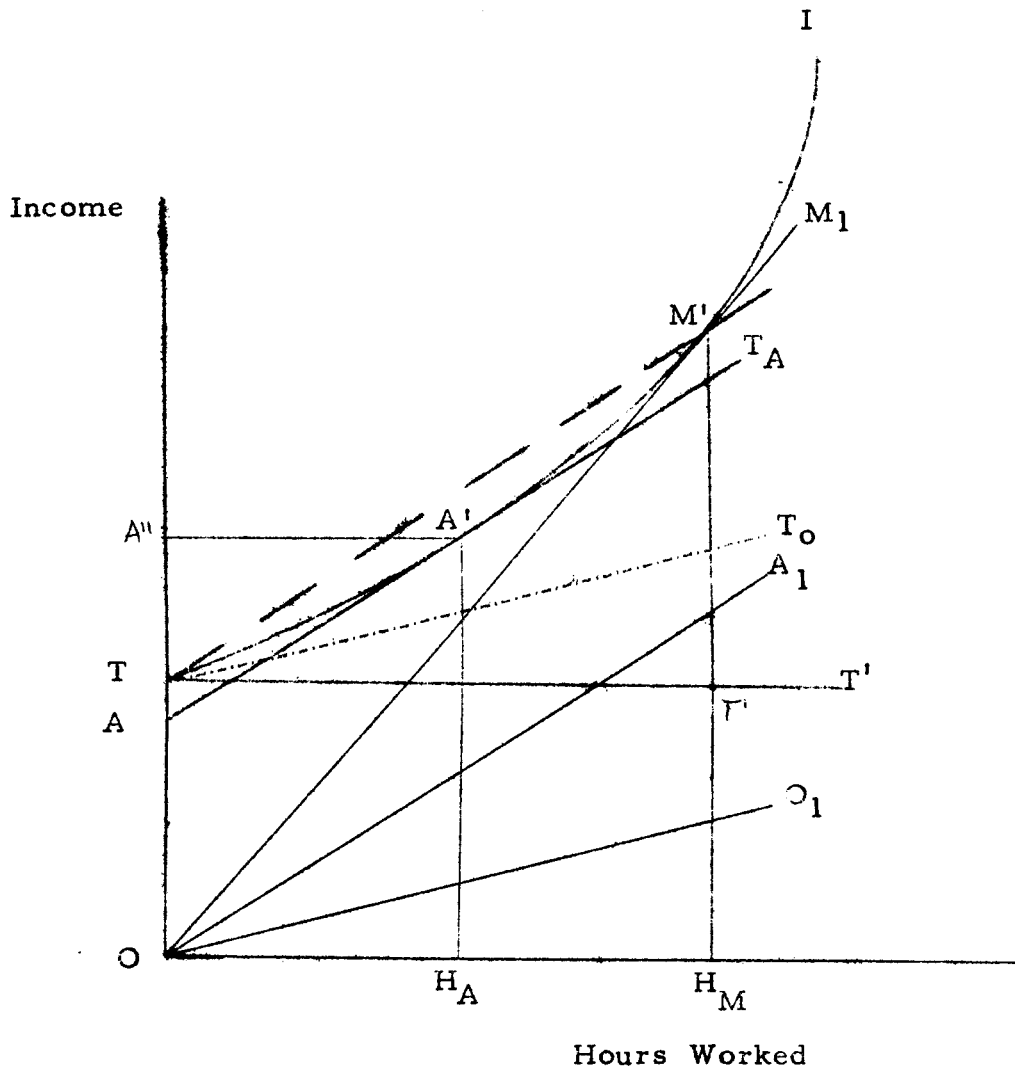
Hours Worked

which is tangent to indifference curve TI at zero hours of labor worked. Thus, even one hour of work would place him on an indifference curve lower than TI.

Group welfare is reduced if he is required to work because the employed workers would be no better off and individual O would be worse off. Those with poorer earning potential or with steeper indifference curves at the vertical axis would remain outside of the labor force in an optimal system. In the latter case those outside the labor force can include some with high earning potential. It is to be expected that a social optimum level of employment will require many part time as well as full time jobs. Consider worker A whose preference function is represented by TI and whose potential earnings fall on line OA_1. He is far better off accepting the transfer although he would earn a higher income were he to work the normal Hm hours. An all or nothing bargain which yielded him the equivalent of the transfer plus a labor income reflecting his productivity, HmM', but which requires him to work Hm hours to receive it would (in this case) leave him as well off, but no better off, than he is not working while receiving the transfer income. Were he to work, national income (as usually measured) would rise, but welfare would be no better served because the whole transfer, OT, would be required to induce him work that much. Both A and those funding the transfer would remain on their same indifference curves But A is also as well off working only H_A hours for H_AA' income.

If his preference for part time work is accommodated, transfers may be reduced to 0A, a saving of AT. The national accounts will reveal a higher income of only TA" but welfare as measured by economists is increased to an optimum.

Paradoxically, if the earnings are viewed as the outcome of a subsidized wage rate the optimal subsidized wage rate is higher for A than for M, as may be seen by comparing the slope of OA' (not drawn) with OM_1. Indeed, it follows as a principle that when the preference structure and size of available transfer income are given, the less the optimal number of hours worked, the higher will be the "subsidized" wage. For example, if individual 0 would be content to work just one hour, and could produce something of value in that time, the other workers would benefit (in an absence of administrative costs) were 0 to be paid the whole transfer less one cent as a wage to induce 0 to work that hour. The wage rate, shown by the slope of the income line would, in that instance, approach ∞. But it is more satisfactory to view A's earnings as being composed of two parts, a transfer of 0A plus earnings of AA". This not only more accurately represents the fact that individuals (not wage rates) are the basis for the subsidy but also makes evident the optimal character of the result by showing the appropriate tangency of the income line to the indifference curve, rather than then displaying a semi-arbitrary termination at A'.

Removal of this externality in the labor markets lowers the firms' factor costs and reduces marginal costs in its product

markets without any accompanying decline in aggregate demand. Instead, the aggregate money demand of the, labor force is increased in proportion to the increase in the output of those formerly excluded from the labor force by the externality providing that a monetary expansion occurs which is just sufficient to finance the increased real output. The transfers are, of course, reduced but that does not affect aggregate demand except as an altered distribution of income may affect saving. Barring reallocative effects it leaves unchanged the prices in the product markets, hence the same demand curve is used for the pre-subsidy (or unrectified) and the post-externality (or rectified) product demand curve shown in Figure 2.

The marginal revenue product curve for labor will shift because the marginal cost of labor falls relative to other factor prices. For convenience, this shift is shown neither in Figure 3, nor in the cost curves of Figure 2. Instead, the demand curve for labor and the cost curves for output are considered to be unchanged up to the unrectified equilibrium position and to shift to lower levels beyond that output when rectification is made.

The subsidization of employment by means of a diversion of existing transfer payments to this purpose provides an additional supply of labor to firms at a lower net cost per worker to the firms. Because it is a net addition to the employed labor force that does not directly effect those previously employed, a new "marginal supply" of labor begins at the pre-subsidy equi-
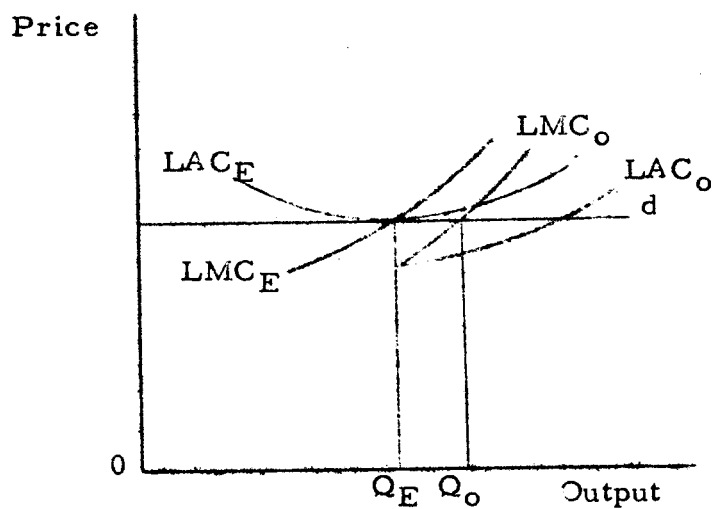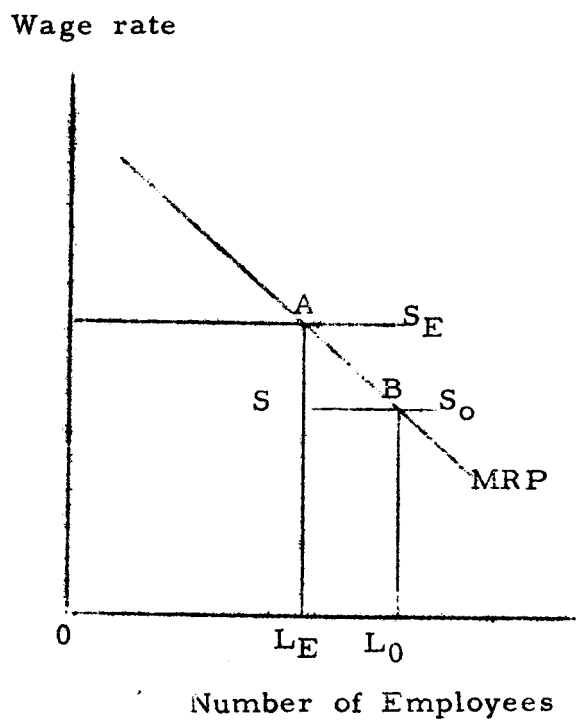
Figure 2

Price

LMC$_o$

LAC$_E$

LAC$_o$

d

LMC$_E$

0   Q$_E$ Q$_o$ Output

Figure 3

Wage rate

A   S$_E$

S   B   S$_o$

MRP

0   L$_E$ L$_0$

Number of Employees

librium level of employment, point S in Figure 3. It is also
shown as a horizontal line because the individual firm will not
be able to influence the marginal wage perceptibly if a proce-
dure such as that outlined in Section III is utilized. But for
society as a whole the marginal supply curve exhibits positive
slope as the transfer funds are extended to attract less pro-
ductive or more reluctant members of the unemployed group from
unrectified labor markets.

The optimal level of employment is found at L_0 (Figure
3) where the firm's marginal revenue product curve intersects
the supply curve adjusted for externalities. As illustrated in
Figure 3, this constitutes an increase of employment of $L_E L_0$.
The additional employment will reduce short run costs enough to
yield a net revenue of as much as SAB in the absence of some
system of recovery of unused transfer payments or adjustments of
output prices.

The effect on the product cost curves is shown in
Figure 2 where the same assumptions with regard to demand shift
and the lack of recovery of excess transfers are continued. The
long run average and marginal cost curves shift downward for out-
puts beyond the pre-subsidy equilibrium as a result of the re-
moval of the externality. The equilibrium output is larger and
short run profits are above normal in the absence of full reco-
very of unused transfers. In the long run, marginal expansion of
output and some reduction of prices will follow. This distri-

butes the gains of fuller employment and higher output widely throughout the economy.

II.   The Negative Income Tax As An Offset

The negative income tax has been advocated by some economists for two decades primarily as a substitute for the elaborate system of social security payments intended to protect the income of citizens from many quite diverse hazards. They argue that the need is primarily for an income transfer which the existing systems provide to only a portion of the needy citizens at very high administrative costs.   Others believe that the accompanying social services account for and justify the high cost of the programs. These matters are beyond the scope of this paper. But the negative income tax is also expected to remove much of the disincentive to work that is attributed to the welfare programs. Milton Friedman's proposals always include this objective, and a specific form of his proposal is used here.

The negative income tax affects the after tax income received from work by low productivity workers. The effect on the man who is marginal when the externalities are unresolved, M in Figure 1 is most relevant to the analysis of the effects of the negative income tax. M's indifference curve between work and income and his potential income curve are reproduced in Figure 4 as lines $T_A I_0$ and OM respectively, with one modifi-

cation to reveal the effect of taxes. The income for a family of four below which a negative income tax is "refunded" and above which a positive tax is imposed is sometimes given as $3,000, the same figure used in calculating the "poverty" level for a family of that size. Suppose that a $3,000 income is represented by the distance OT_A in Figure 4. If the negative income tax rate is 50% and the positive tax rate beyond that point is 15% the dashed line AA'A" is the curve of disposable income for individual M. If he retains the option of a welfare payment of T_A he is better off not to work to achieve income H_mM, his best after-tax income.

The negative income tax will have no influence on the marginal worker's decision in this case and would not even if the negative tax rate were 100%. This is true because it does not affect earnings in the critical marginal range near point B'.

The opposite policy of forgiving taxes on income earned *above* the zero tax level under the negative income tax would restore worker M to indifference between working and not working. A negative tax at this higher level would induce M to work.

These conclusions depend upon the low level of income at which the negative income tax takes effect. If the negative income tax rate is held at 50% but the income level to which a zero rate applies is raised to T_B, worker M becomes indifferent

Figure 4
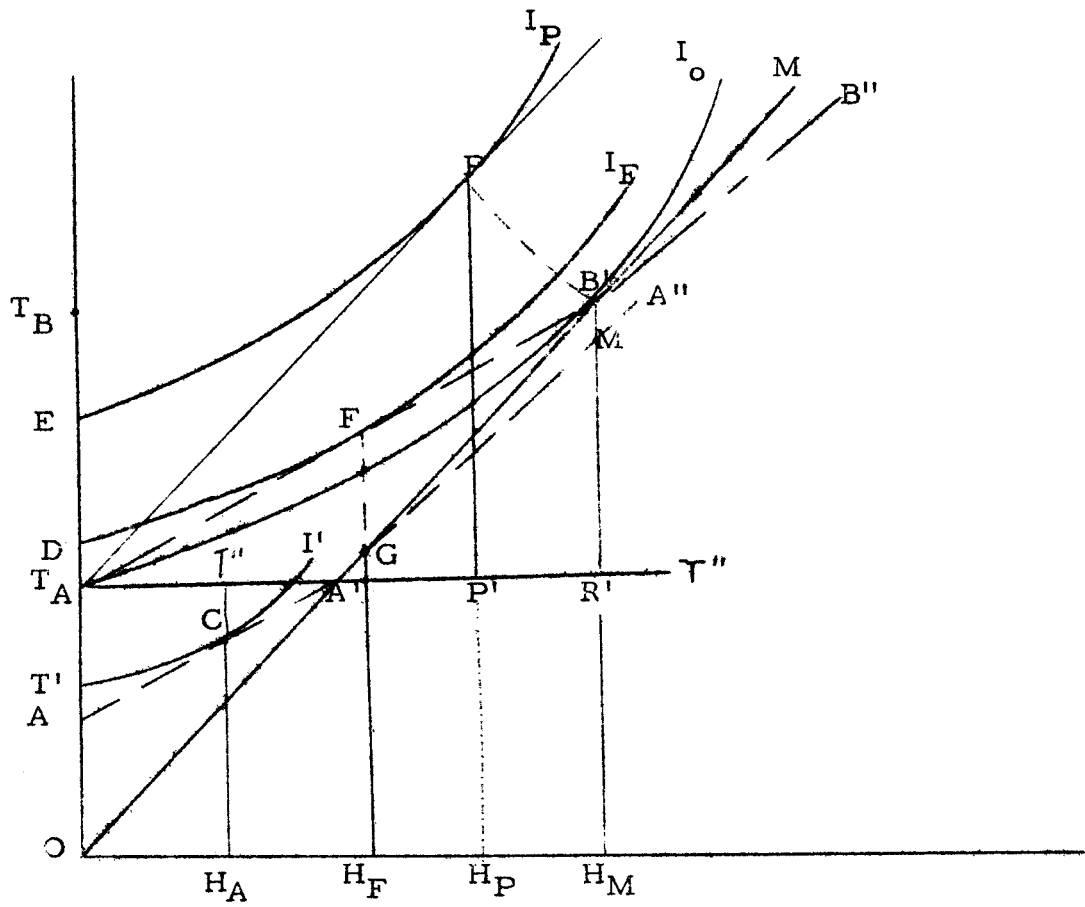
between working H_M hours and not working but he will prefer the option of working H_F hours. His after tax income line is then T_ABB' which is tangent to the higher indifference curve T_AI_F at point F.

An improvement in welfare results. Transfer payments are reduced from OT_A to FG benefiting taxpayers, and the newly employed worker is better off than he was before. GNP rises by H_FG. This improvement falls short of a pareto-optimal result, as must any system of negative income taxation because the negative income tax inevitably flattens the income possibility curve in the relevant range restricting the preferred level of work to a sub-optimal level.

One may complain that violence has been done to Friedman's proposals because they use the negative income tax to replace the option of receiving welfare payments. Thus individuals lose the option of accepting the present level of welfare payments. It is true that this will increase the supply of labor even when the OT income is associated with the zero **tax** payment, and it is illustrated by the tangency of after tax line AA' to indifference curve $T'I'$. It is also true that welfare payment is ~~eliminated~~ ^{cut to T"C} (benefiting the taxpayers), and that GNP is increased by the amount of added production, H_AC. But it does not follow that the economy is closer to a welfare maximum. The condition of the taxpayers is improved, but the welfare of those formerly on relief is worsened. The well-known strictures con-

cerning interpersonal comparisons of utility hold, and no wel-
fare conclusion is possible. Hence, the analysis relating to
equilibrium point F advances the strongest version of the neg-
ative income tax.

Two optimal positions that contrast with the best of
the negative income tax results are also illustrated on Figure
4. Each represents an end point of the contract curve of
pareto-optimal options. One extreme, shown in Figure 4 as point
B', is that analyzed in Figure 1 with a modification to take in-
to account M's probable taxes if he chooses to work. The tax-
payers are better off by the amount of the transfers saved plus
administrative costs saved (here assumed to be zero) plus the
taxes that M will pay if M works and earns $H_M B'$. On the other
hand M will be worse off working than not working to the ex-
tent that he assumes a tax burden if he works. Thus if M is
forgiven his taxes, MB' + \$1 of the gains he will choose to work
and all of the gains (except the \$1) will go to the taxpayers,
and no one is made worse off. National income rises by $H_M B'$.

The other extreme of the pareto-optimal contract
curve exists where all of the gain accrues to the presently
unemployed, but the taxpayers are made no worse off. At this
optimum position, M works Hp hours and receives tax free in-
come of $H_p P$, of which $H_p P'$ is a continuation of the transfer
payment. The new worker attains the higher indifference curve
EI_p. The taxpayers' obligations remain unchanged, and the real

income available for them also remains unchanged.

An indefinitely large number of pareto-optimal positions lie along some curve like PB'. Each such point divides the gain that results from optimal employment differently between the taxpayers and the formerly unemployed. All are superior to any that can result from the negative income tax.

III. Application to Free and Market Socialist Economies

The mixed but essentially free economies of the modern world that rely heavily upon the private sector for economic performance, and market socialist economies are in a position to overcome the unfortunate effects of the secular external economy in the labor market but have not done so in the past.

In evaluating the following suggested means whereby the secular externality in a free labor market can be overcome one should understand that it is not put foreword as a substitute for systematic programs of training and orientation designed to help disadvantage individuals achieve optimum productivity and employability. Such programs are also attacking an external economy in the labor force by adjusting for the fact that the private cost of hiring such workers is substantially above the wage rate although the social cost may be no higher, or even below, that figure. In the present case, the private cost is also above social cost but it is not because of problems

involved in making investments in manpower development reward those who bear the costs. Nevertheless, a similar approach may be fruitful for the financing of manpower development programs.

The procedure outlined here is the one thought to be the most compatible with a system of free individual choice in a basically private economy. It takes as given the present level of transfer payments through old age and survivors insurance, unemployment insurance, public assistance and aid to dependent children. Hereafter these are referred to collectively as "welfare programs".

The key step toward the removal of the externality is to encourage recipients of funds from welfare programs to consider the alternative of employment that will yield them incomes substantially above the welfare payments which they receive by directing the relevant welfare agency to route their payments through a private firm or operating public agency of their choice. The firms will then receive the transfer funds which they must transmit in full to the individual, except that they will also acquire the opportunity to employ the transferee paying any combination of transfer plus wage as may be agreeable to both parties. Any firm or agency may attempt to induce transfer recipients to join their firm in this manner. Since substantial opportunities exist for mutual gain, it is reasonable to suppose that many individuals will elect this option, and that most firms will cooperate willingly.

Government supervision will be necessary to make sure that those who do not work continue to get their full allocation promptly, although unions and other employee organizations should find it in their interest to protect the rights of these people.

The firms cannot avoid non-negligible clerical costs involved in affecting the transfers and will have a strong incentive to employ as many as possible so as to be able to profit from that part of the transfer payment which is not needed in the contract worked out with the transferees. It is to be expected that the contracts would be stated in monthly amounts, or in some other terminology that would include the total payment rather than a transfer amount plus a certain hourly wage. This is desirable to avoid any implication that the wage rate is below any legal minimum. As noted above, calculating the total payment on an hourly basis yields a high figure although the wage rate over and above the transfer income may be small.

It is highly probable that in the initial period many individuals will flock to well-known firms and few to others. Moreover, in the long run some firms will enjoy an expanding demand for labor while others need fewer workers. In these circumstances the over-supplied firm should be free to encourage those on their lists to transfer to other firms, and the under-supplied firms should be able to make known their offers publicly or privately in an effort to induce workers to join their ranks. Since the transferees carry their transfer incomes with

them, so to speak, they are a valuable resource for firms needing additional manpower, and the transferee-workers should enjoy competition for their services. If there is none, however, they will continue to receive their full transfer payment.

One may feel that the procedure outlined above thrusts sharp wage-reducing competition at the regularly-employed worker. This is not the case. Consider Figure 5 which again illustrates the optimum positions of three workers with the same tastes but different productivities. The three wages are again indicated by the slopes of total income lines OS, OM and A'A and reflect the marginal productivity of workers S, M, and A respectively at the hours worked associated with the points of tangency. The ratio of marginal product to the wage is the same for each worker, so the employer cannot gain by substituting one for the other. Each individual is also in equilibrium because his indifference curve is tangent to his income line. It is true that the somewhat greater supply of labor may slightly lower average level of money wages when the externality is eliminated, and that the real income of certain groups may decline slightly unless the offsets are perfect. But total real income rises, and should be widely shared as the result of the competitive forces in the economy. In any case, there is no tendency toward wage equality because there is nothing in this program taken by itself that diminishes differences in productivity.

New entrants to the labor force can, perhaps, added

Figure 5
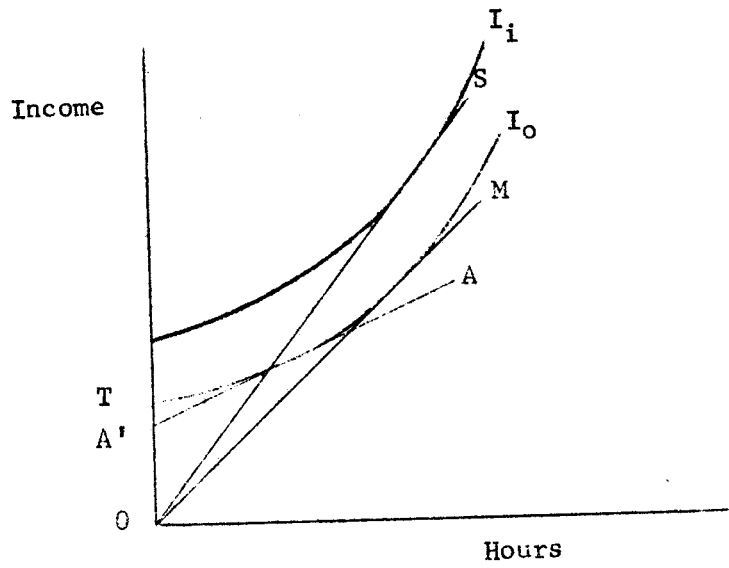
to a program such as this so as to further the objectives of the manpower development programs. The transfers to new, presently unemployed, workers should be quite low to provide incentives to adapt themselves to the discipline of work. But the transfers can be accompanied by additional short-term payments to the firms calculated to offset the additional training and orientation and turnover costs that create the external economies presently recognized in the American manpower development programs. The same processes for establishing a connection with existing companies and agencies, and transferring them as occasion demands can be utilized for new, and otherwise disadvantaged workers who are capable of reaching higher productivity status. But basically, this is a different problem.

IV. Summary

An important externality apparently exists in fully competitive market economies despite optimal monetary and fiscal policies and an absence of dynamic adjustment problems. This externality produces significant levels of chronic unemployment. Some applications of a negative income tax can reduce the size of the externality but it cannot lead to a pareto-optimum level of employment. And alternative procedure which is compatible with a market economy of either the western or market socialist types can do so. The implications of this analysis for macroeconomic policy with regard to unemployment are left for another occasion.

FOOTNOTES

*The author is a Visiting Professor at the University of the Philippines on leave from the University of Washington. The basic argument presented in Section I formed part of his Presidential Address to Western Economic Association in August, 1968. He wishes to thank William J. Baumol, José Encarnación, Jr., Harry T. Oshima and John H. Power for their helpful comments.

[1] A review of the available literature has revealed only one writer who seems to have observed the externality presented here. W. Arthur Lewis, *Development Planning*, London, 1966, pp. 62-64 notes the discrepancy in a choice of techniques situation. I am indebted to John H. Power for this reference.

[2] Less specialized and non-market economies largely may avoid secular unemployment because the necessary transfers are made within the family or clan and the amount of benefit to the individual or group from additional activities is not obscured by the existence of the transfers. It is interesting that such activities as the use of family funds to purchase jobs is a logical way for a family to overcome the externality.

In modern economies third degree price discrimination can help overcome the externality. Such devices as export subsidies to expand domestic employment beyond the competitive level can be cited. These are crude methods that do not get to the root of the problem.

DAWjr:pfi
14.I.69