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The Macroeconomics of A Negative
Income Tax

by

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The Macroeconomics of a Negative Income Tax

A. Introduction

From time to time public policy proposals which once were far out, quite suddenly achieve social respectability. This seems to be the case with the "social dividend" when it is dressed up in its currently more fashionable garb as a "negative income tax". A social dividend is very simple. It transfers to every person alive, rich or poor, working or unemployed, young or old, a designated money income by right. Income taxes are paid on receipts from work, property or other transfer schemes. Such taxable income is defined in the tax code, and almost without exception in the various tax codes income in the form of the services of owned property or 'household' labor is not included in tax code income. Thus private disposable income is the social dividend plus tax code income minus taxes.

A negative income tax is rather more sophisticated in form. It transfers to every eligible unit a cash payment which is some portion of the difference between its actual and some designated, or target, tax code income.

For example, for a household of four the social dividend might be worth \$3,000 per year and a tax of $1/3$ might be levied on "tax code" income. Thus no tax code income results in \$3,000 of disposable income, \$6,000 of tax code income results in \$7,000 of disposable income, $(\$3,000 + \frac{2}{3} \$6,000)$, \$9,000 of tax code income results in \$9,000 of disposable income and \$12,000 of tax code income results in \$11,000 of disposable income.

A negative income tax is designed to supplement private income from work, property or transfers by making up a portion of the difference between tax code income and a target income. Thus a scheme equivalent to the above social dividend would add to private disposable income one-third of the difference between such income and \$9,000. Once again zero tax code income results in \$3,000 of disposable income, \$6,000 results in \$7,000 of disposable income, \$9,000 results in \$9,000 and \$12,000 will pay a net tax of $1/3$ on $(\$12,000 - \$9,000)$ resulting in \$11,000 of disposable income.

There are three 'parameters' to a social dividend or negative income tax: the minimum guarantee, the tax rate on earned income, and the break even or target income where disposable income equals earned income. Once any two of the parameters are given, the third can be computed. A negative income tax scheme fixes the target income (\$9,000 in our example) and the tax rate. The

minimum income is computed. A social dividend fixes the minimum income (\$3,000 in our example) and the tax rate. The break even or target income is computed.⁽¹⁾

Thus the two schemes are identical in substance, only the label is different. Administratively a social dividend seems simpler, and I venture to guess that if adopted the form will be that of a social dividend and the language that of a negative income tax. In terms of the analysis that follows the impacts of a negative income tax on the various relations might be seen more clearly if it is assumed that each family receives a monthly check which is determined solely by family size: for the family of four of the examples the monthly check will be \$250.

There are great differences among the various proposals, however labeled. These differences relate to the scale or generosity of the proposal.⁽²⁾ Perhaps the general idea is popular because the various proposals so differ in scale, cost and objective that it is possible to be for the idea for many different reasons. Some proposals are not offered as a solution to poverty defined in terms of the adequacy of private disposable income; they are offered as solutions to the social and administrative messes that are presumed to characterize existing welfare and income supplement schemes.⁽³⁾

Proposals which distribute no more to the present poor than the existing programs but which do it more efficiently and humanely are not at issue. Reforms of welfare for such objectives might very well be a "no-loss" game: there are savings and benefits without any appreciable costs or losses.

What is at issue is the efficacy of a negative income tax as an instrument in an effort to eliminate poverty, defined in terms of some absolute or relative private real income. For a negative income tax to have this effect it must first deliver to the present poor and near poor a larger money income than existing welfare schemes. Whether this larger money income will turn out to a larger real income needs investigation.

A negative income tax or social dividend scheme that is an instrument in an effort to eliminate poverty will

- (a) set a substantially higher floor to family money incomes than now exists,
- (b) set an effective marginal income tax rate on even the lowest tax code incomes that is substantially higher than the existing

marginal income tax rates on tax codes incomes as large or even larger than the break even income, and

- (c) deliver net benefits, as measured by disposable money income, to households that have tax code incomes that are well above the poverty line, however it may be defined.

In addition, the benefits will be by right (no means tests), and will be responsive to changing circumstances. There will be no substantial lags or costs in getting on or off of the benefit receiving status as earned income or family status changes.

Points b and c are related. They show that a trade off exists between the numbers for whom the substitution ratio between leisure and work is changed by the higher tax rate and the size of the change. The higher the marginal tax rate for a given income floor the lower the upper limit to incomes that receive net benefits. That is a \$3,000 floor to income and a 50% tax rate on tax code income will lead to a \$6,000 ceiling to incomes that receive net benefits, with the same minimum a $33\frac{1}{3}\%$ tax rate yields a \$9,000 ceiling to incomes that receive net benefits.

The higher the tax rate the greater the substitution effect upon each impacted household, i.e. the greater the stimulus to substitute leisure for work. The lower the tax rate the greater the number for whom a rise in the marginal tax rate occurs, the greater the number for whom the stimulus to substitute leisure for work has increased. As the distribution of income from work is roughly bell shaped, a decrease in the tax rate on earned income will lead to a relatively large increase in the number for whom there exists a positive disincentive effect due to higher taxes as long as the break even income is not greatly in excess of the median income. The choice is between a large disincentive effect on a relatively few or a smaller disincentive effect on many.

Welfare schemes which offset earned income by equivalent decreases in welfare benefits are in effect a 100% tax on earned income. This maximizes the disincentive per unit affected but it minimizes the size of the impacted population. Small social dividends which can be financed without any rise in the tax schedule (as a result of the so called fiscal dividend) will not affect the substitution ratio between work and leisure, excepting as it is an alternative to lowering tax rates on earned income.

The additional point about administrative responsiveness and ease means that the negative income tax scheme becomes a guarantee of a minimum cash flow per period to each household.

The negative income tax is but one example of a welfare scheme. It is unique in that it provides a floor to money income as a right and combines the floor to income with a tax on earned income that is substantially higher, for both low incomes and incomes in the neighbourhood of the median, than now rule. Some of what holds for the negative income tax holds for all schemes that attempt to affect the distribution of income by transfers and taxes including schemes which provide income in kind such as medicare. Some of what holds, such as the implications of higher marginal taxes on earned income, are special to the particular set of schemes.

In designing the evaluating a welfare scheme, or any other scheme, allowance must be made for its systemic as well as its direct or primary efforts. This means that a model of the economy must be set up and the various functions of the model must be modified to allow for the scheme. Once this is done, the differences in behavior or properties of the model with the unchanged and the modified functions can be determined.

In order to determine the macro-economic effects of a negative income tax, it will be assumed that an income-expenditure model that explicitly incorporates uncertainty is a good description of the economy.⁽⁴⁾ Thus the negative income tax will be assumed to have implications for consumption, investment, and portfolio behavior, as well as for the supply of labor.

In addition to the assumptions about the impact of the change in the welfare schemes upon the functions of the macro-economic model, it is necessary to make some assumptions about the policy goals. This is so because if the macro-economic effects of a negative income tax initially lead to undesired changes in variables that are other policy objectives, action taken in an attempt to achieve the other policy goals may erode the effect of the negative income tax.

It will be shown that a negative income tax is expansionary or inflationary, even if budgets are balanced. Monetary and fiscal constraint can offset this inflationary pressure, but at a cost in the measured gross national product and rate of growth. If measured gross national product or its rate of growth are policy goals, then general monetary and fiscal constraint is not

available. There exists a price level at which the real value of the negative income tax equals the real value of the prior welfare schemes. If distributional details are ignored, at this price level the pre negative income tax equilibrium is re-established. However the distributional details cannot be ignored. If the negative income tax induces inflation, there will be an upward shift in tax code incomes. Families which initially were net beneficiaries would cross the break even line in dollar terms and experience a decline in their real income. Simultaneously, the rise in prices will erode the real value of the benefits to the poor. The end result will be an equilibrium which delivers less in real terms than promised to the poor while biting more deeply than anticipated into the real income of the not poor but not very well off population.

As the negative income tax is but one example of a welfare system change, what is true about the expansionary and inflationary effects is true about any significant improvement in the welfare system. The post war economic history of Britain, with its relatively slow rate of growth, in part may be due to the combination of an expansionary (inflationary) stimulus of the welfare scheme and the existence of a balance of payments constraint. The recent inflationary pressure in the United States, and the resistance of the inflation to monetary and fiscal constraint followed upon substantial increases in Social Security, the introduction of Medicare, and improvements in the welfare system associated with the war on poverty.

The lesson to be learned from this exercise is that system wide as well as direct effects must be considered in evaluating public policy instruments. System wide repercussions can offset, in all or in part, the direct effects of a policy action and in addition impose unintended costs or losses. It is obvious from what follows that a negative income tax generous enough to significantly reduce or eliminate poverty will have many repercussions. It is shown that these system effects tend to offset at least part of the initial benefits to the poor and may impose unintended real costs upon families with modest incomes.

B. Impact points of a Negative Income Tax

There is no need to quibble over the specifics of the program. For our example of a meaningful negative income tax a standard family of four is assumed to receive a \$3,000 social dividend and to pay a $33\frac{1}{3}\%$ tax on the first

£15 thousand of tax code income. For tax code incomes greater than this the marginal tax rate will be unchanged at $33\frac{1}{3}\%$ or more. With this scheme every family making less than £9,000 a year is better off. If we assume that the rate on £9 to £15 thousand tax bracket was 25% prior to and $33\frac{1}{3}$ after the tax, then for those making in excess of £15,000, a £500 decrease in disposable income will occur, for those between £9,000 and £15,000 the decrease in disposable income will be a proportional part of the £500. If this tax does not gather enough to pay for the negative tax payments, then it will be necessary to add some percentage points to the tax schedule either to all incomes or perhaps only to those above the break even income level.

It is assumed perhaps heroically, that the negative income tax would not by itself throw the government's budget out of balance at full employment. That is the increase in the marginal tax rates on earned income above the break even level as well as the funds released from existing welfare schemes will fully pay for the program. Thus initially we conceive of the scheme as a transfer, where the sum of cash benefits equals the sum of taxes paid on account of the scheme and the funds released from other schemes.

An effective negative income tax will have three direct effects:

1. an income and a substitution effect operating through the supply of labor function,
2. a wealth effect operating through the consumption function,
3. a cash flow effect operating through the liquidity preference function.

As a result of the impact upon the liquidity preference function, the amount of investment can be expected to change. In addition to the extent that entrepreneurial expectations as to how the economy will function are affected by the negative income tax, there will be an effect upon the investment function.

An effective negative income tax will increase the disposable income of those earning less than the break even income, lower the marginal tax rate on the welfare poor and raise the marginal tax rate on income from work for the working poor as well as for families in the neighbourhood of the break even income.

Presumably an income effect due to the higher minimum income guarantees will tend to induce withdrawals from the labor force. The marginal tax rate

on the welfare poor will be reduced from 100% as in present welfare schemes to the rate in the negative income tax scheme. This will tend to increase labor force participation. Thus there will be some offsetting tendencies on the labor offered by the very low income population and the welfare poor that will follow from the substitution of a negative income tax for the present welfare schemes. As an aside it is worth noting that a reduction of the tax rate on earned income for the welfare poor could be obtained without any of the other features of the negative income tax proposals. Since this 100% tax aspect of welfare schemes has been pointed out some welfare schemes have been modified to eliminate this feature.

A negative income tax will raise the marginal tax rate on income from work for families well up in the income scale. Many families with head of household working full time will simultaneously experience a rise in disposable income combined with a rise in the marginal tax rate. Using our standard example of the tax scheme a household earning \$6,000 a year of tax code income will have a disposable income of \$7,000. If the household "feels" that a \$6,000 disposable income is adequate, it can achieve this by reducing its labor market participation so as to earn \$4,500 a year of tax code income.

A significant portion of total labor used is from second wage earners in families, overtime, and moonlighting (second jobs). Even if the basic work week labor, mainly supplied by heads of households, is not affected by such a tax the willingness of women to take on part-time work (Christmas etc.) and for the head of the household to work overtime or moonlight will be affected. Thus for the large group of families clustered below and around the median the tendency will be to substitute leisure for income as a result of the lower net return from work.

It is worth noting that leisure as measured by not participating in the labor force may be more valuable to households with adequate incomes and some property than to those with low incomes and no property. Much of recreation presupposes income. But in addition not participating in the labor force need not imply idleness. Do it yourself is a way of supplementing tax code income by income in kind. Such income is most available to household with some property; for example the improvement of an owned home by sweat capital.

Experimental attempts to measure the disincentive effects of a negative income tax are highly desirable.⁽⁵⁾ However studies which examine the reaction

of very low income workers may miss what can be the most important labor market participation effect of such proposals, the withdrawal of some labor from families already represented in the labor force whose incomes are well above the poverty level. Behavioral assumptions made by those with high incomes, whose very job yields "income" in kind, and tested on those with very low incomes may have little predictive validity for the behavior of the largest group affected by a negative income tax, those whose incomes are clustered around and just below the median incomes.

Labor supplied can be considered to be a function of the real wage, real non-human capital and the real capitalized present value of the welfare system. At any moment of time the welfare system's benefits are fixed in money terms. If we posit a capitalization ratio K applicable to the nominal benefits from the welfare system E , then the real capitalized value of the welfare system is KE/p , where p is the price level appropriate to the standard of life of the impacted population. The labor supply function is

1. $N_s = N_s(\frac{W}{p}, V, \frac{KE}{p})$ where N_s is the labor supply, W the money wage, p the price level, V the real market value of non-human wealth and KE/p the capitalized value of the welfare system. From the above arguments we would expect that

$$\frac{\alpha N_s}{\alpha (\frac{KE}{p})} < 0 \quad ; \quad \text{we also have that} \quad \frac{\alpha N_s}{\alpha (\frac{W}{p})} > 0$$

$$\text{and} \quad \frac{\alpha N_s}{\alpha V} < 0 \quad .$$

If effective, a negative income tax raises the floor to real income for all families which do not have a substantial net worth. Given a family's income, human and non-human wealth, and taking the economic and demographic position of the family into account, there exists contingencies under which their current disposable income and income in kind would, in whole or in part, be due to the welfare system. The value of these welfare receipts under the existing law times the "subjective" likelihood of the various contingencies occurring, discounted back to this date at some appropriate interest rate, gives the present capital value of the welfare system to a household. Households not on welfare - or not even receiving net benefits from the negative income tax - are made better off by the existence of such protection against even unlikely contingencies. This is so because the typical household is a

risk averter and the welfare scheme is in the nature of "free" insurance policy. Certainty of income at the minimum level or certainty of supplements on the occurrence of contingencies are, for risk averters, the equivalent of an increase in present wealth. (6)

A meaningful negative income tax will raise the present value of the welfare system substantially for the poor and the near poor. If the likelihood of unemployment or short time is taken into account, a large portion of workers experience such impoverishing events over a 4-5 year period. Such families will be better off by some substantial amount as a result of the higher floor to disposable income i.e. the capitalized value of the improved welfare scheme will be a substantial portion of the family's non-human wealth.

Many studies have shown that wealth - human and non-human - affects the consumption-current or measured income ratio: the higher the wealth or permanent income for a given level of actual income the greater the consumption level. An improvement in the system of welfare payments by in effect increasing wealth can be expected to raise the consumption - measured income ratio of all except those at the very highest incomes.

Consumption expenditures can be considered to be a function of income, real non-human wealth, the interest rate and the real capitalized value of the welfare scheme. That is the consumption function is

2. $C = C(Y, V, r, \frac{KE}{p})$ where C is consumption, Y income, and r the interest rate. We expect that $\frac{\alpha C}{\alpha(\frac{KE}{p})} > 0$, we also expect $\frac{\alpha C}{\alpha Y} > 0$, $\frac{\alpha C}{\alpha V} > 0$, and $\frac{\alpha C}{\alpha r} < 0$.

If the cash flows from labor and property are susceptible to reduction due to economic or life cycle events a household, if rational, will hold some precautionary balances of liquid or cash assets. The introduction of a negative income tax will mean that for many units a substantially higher minimum cash flow per period will be guaranteed than was true prior to the tax. Thus precautionary holdings of cash and near cash assets can be decreased. The affected households can reduce their liquidity either by going into more adventurous financial assets or by purchasing consumer's capital goods. This portfolio transformation will mean that the average cash and near cash balance per dollar of income and of other assets will decrease. Independently of any expansion in the money supply aggregate money demand will increase as a negative income tax is introduced. In the conventional language of economics

the guarantee's embodied in an effective negative income tax will tend to increase velocity.

The liquidity preference function, interpreted as a demand for money, can be considered as a function of money income, the interest rate, the money value of the capital stock and the money value of the welfare system. Thus we can write

$$3. \quad M_D = L(Y_p, r, V_p, KE) \quad \text{and} \quad \frac{\partial M_D}{\partial KE} < 0 ; \quad \text{we also have that}$$
$$\frac{\partial M_D}{\partial Y_p} > 0, \quad \frac{\partial M_D}{\partial r} < 0, \quad \text{and} \quad \frac{\partial M_D}{\partial V_p} > 0.$$

A change in welfare laws that raises the capitalized value of welfare will not have a direct effect upon investment. An improvement in welfare will reduce the demand for money balances and thus will tend to lower interest rates. This in turn will tend to raise investment.

The impact that an improvement in welfare will have upon labor supply can be expected to induce a substitution of capital for labor in production, thus generating an increase in investment demand.

These system impacts upon investment will however be smaller than the effect upon investment that can follow from any change in the expectational climate that may follow upon the improvements in welfare. It will be argued that the labor supply and the consumption function shifts, together with the facilitating effects upon the demand for money, will induce an inflationary expansion. As this becomes apparent, speculative shifts in the investment and liquidity preference functions will take place.

It should be noted that no quantitative estimates of these various impacts exists and quite likely that some of the effects will be small. However they all operate in the same expansionary-inflationary direction, and it is the combined or cumulative effect that is at issue.

C. System Behavior

A number of models of increasing complexity will be used to show how a negative income tax can be expected to affect system behavior. These models will assume that there are policy goals, which can be stated in terms of the level of measured real gross national product or the rate of growth of real gross national product in addition to the "goal" expressed in the welfare scheme. In a later section the implications of a policy goal of price stability will be examined.

(1) Labor Demand and Supply

Let us assume a target real gross national product as the policy goal. For simplicity output produced is a function of labor employed. At a given money wage, W_0 , target aggregate demand is transformed into an elastic demand for labor:

4. $N_D = \bar{N}_D \left(\frac{\bar{Y}}{p}, W_0 \right)$ where N_D = labor demand and $\frac{\bar{Y}}{p}$ is the target real gross national product. The price level is a mark up on the money wage rate

5. $p = \lambda W_0$ with $\lambda > 1$

At the initial value of the welfare scheme labor supply equals labor demand

6. $N_S = N_D$, i.e. $\bar{N}_D \left(\left(\frac{\bar{Y}}{p} \right), W_0 \right) = N_S \left(\frac{W_0}{p}, \bar{V}, \frac{KE}{p} \right)$ so that

7. $W_0 = Q \left(\bar{Y}, \lambda, \bar{V}, KE_0 \right)$ where $\bar{\quad}$ indicates initial values which do not change over the period, E_0 is the initial money value of the welfare scheme.

An improvement in the welfare scheme which raises its real present value reduces the labor supply. At W_0 as determined in equation 7, $N_D > N_S$ i.e. excess demand for labor appears. This implies rising money wages which in turn means rising prices. Real wages do not rise. Rising wages and prices reduce the real value of the welfare scheme. There exists a price level such that the real value of the welfare scheme is back at its original value. At the wage rate corresponding to this price level the initial equilibrium is re-established. With a facilitating monetary system, a target level of real gross national product and a fiscal system (excluding the welfare system) that is fixed in real terms any improvement in the welfare system must be inflated out.

(2) Consumption and Growth

The impact of a negative income tax on consumption can be divided into two parts: the first due to rise in transfer payments to low income groups, the second due to the wealth effect of the legislation.

It is assumed that the budget remains balanced even though welfare transfers are increased. Thus taxes offset the transfer payments. The rise in present value or the disposable income of the actual benefit recipients are offset by an equal decline for the actual tax payers. It is also assumed that there is no net distribution effect upon consumption: the gains in consumption by the actual recipients offset the decline by net tax payers.

However in addition to the actual transfer payments there is a net gain from the insurance policy absorption of uncertainty aspects of the scheme.

If we write the consumption function

8. $C = C(Y, V, r, \frac{KE}{p}, E_t, T_t)$, E_t and T_t being the t^{th} periods benefits and taxes, and $E_t = T_t$ for all t it is nevertheless true that $\frac{dC}{dE} > 0$ i.e. an equal rise in welfare payments and taxes will raise consumption. This is so because $\frac{d(\frac{KE}{p})}{dE} > 0$ for the increased security that the larger transfer provides decreases the incentives to save.

Let us ignore the labor supply impact of a negative income tax - thus current income remains target income and no price pressures exist due to excess demand for labor. Let us, for the moment assume investment exogenously determined. An upward shift of the consumption function will increase aggregate demand - and at current prices aggregate demand will exceed aggregate supply.

In a simple classical model a shift of this sort in the consumption function will raise the interest rate and assuming the correct shapes raise consumption and lower investment. The unchanged Gross National Product will be split differently between consumption and investment.

However if the rate of growth of output is a policy goal, then the decline in investment will lead to a decline in the rate of growth. The policy goal of growth means that an attempt will be made to finance and put in place an unchanged amount of real investment. This implies an excess demand for both output and labor. Wage and price increases will erode the value of the welfare scheme in nominal terms. Thus an equilibrating process tending to inflate out the rise in the welfare schemes will take place. Equilibrium at the old real value of the insurance aspects of welfare will be reached.

Both the consumption and the labor supply impacts of a rise in welfare schemes tend to generate an excess demand for labor and wage and price increases. Thus we can assert that if $(\frac{KE_0}{p_0})$ was consistent with equilibrium in both markets and $E_1 > E_0$ is introduced, then there exists a p_1 such that

$(\frac{KE_1}{p_1}) = (\frac{KE_0}{p_0})$ which makes E_1 consistent with the simultaneous equilibrium in the two markets. The market disequilibria set up where the schemes are introduced will tend to generate price movement towards p_1 .

(3) Liquidity Preference and the Financing of Excess Demand

The introduction of a negative income tax is equivalent to introducing in all portfolios a fully paid up insurance policy which sets a floor to cash receipts. For families, including many now well above the median income, this

floor is considerably higher than the minimum assured cash flow without the negative income tax. Adjustments will be undertaken in the light of this addition to portfolio.

At existing asset prices families will now have excess supplies of cash and near cash assets and too little in the way of business and household real or equity investments. In addition the larger assured cash flow will make households willing to emit liabilities that commit future cash flows and to use the funds so raised to purchase real household assets and equity type financial assets. Thus a spillover via portfolio adjustments to investment exists.

The larger assured minimum cash flow will increase the attractiveness of such household liabilities to financial intermediaries.

A negative income tax interpreted as a portfolio change is expansionary. In conjunction with the impact that a negative income tax has upon consumption and the labor supply this means that the excess aggregate demand can be financed. It is not necessary for the monetary and fiscal authorities to be accommodating, it is sufficient if they are passive; an improvement in the welfare system tends to increase velocity.

If equilibrium in the labor, commodity and money markets existed at an initial price level and value of the welfare system and if the capitalized value of the improvements in the welfare system as it affects the labor supply, consumption and liquidity preference system is the same, then there exists a new price level such that the real value of the augmented welfare system equals the real value of the initial welfare system.

(4) Investment and Expectations

A spillover from the portfolio relation to the price of the stock of real (and equity) assets and thus to the demand price for investment has been noted. In addition the portfolio impact will tend to make the terms upon which new investment can be financed more favorable. Thus with an unchanged investment function, the amount of investment put into place can be expected to increase. Imbedded in the positioning of the investment function is the expectational climate. If changes in the expectational climate can be expected to follow upon the introduction of a negative income tax, this indirect effect upon the investment function can have a greater effect than that by way of financing terms and demand prices for investment.

If a negative income tax leads to a significant rise in the floor to real income, it will imply a rise in the minimum expected consumption levels. In addition investment tends to respond positively to inflationary expectations. If inflationary pressures begin to be observed, investment will tend to respond positively. Thus the improved real prospects and the price level expectations that can be expected to follow a negative income tax will tend to shift the investment function 'upwards'.

(5) Conclusion

By itself, unless counter measures are taken, the introduction of a negative income tax will tend to generate inflationary pressures. It can be shown, under rather strict assumptions, that such pressures will continue as long as the welfare system's real value is greater than its initial or equilibrium real value. Thus the improvement in the welfare system will be inflated out.

If we assume that there are no distributional effects, then the end result will be a welfare floor to income no greater than the initial floor; however distributional effects exist. Even if the real value of the welfare system returns to its initial value it does not necessarily follow that the value of the welfare system to the poor and the near poor returns to its initial value. However, to the extent that there are residual benefits to the poor there will be costs imposed upon other groups which differ from the costs initially imposed by the tax scheme. Thus distributional effects and the effects of relaxing the policy goals need to be considered.

D. Distributional and Policy Goal Effects

A negative income tax will affect many facets of system behavior. Therefore it is necessary to distinguish between the actual and the intended result of such a change. A negative income tax is adopted to change the distribution of income in a particular way. Changes in money disposable income, as stated by the law, are at least implicitly taken to be changes in real income. As a result of the system wide effects that follow from the introduction of a negative income tax, the actual changes in the distribution of income will be different from those intended.

The introduction of a negative income tax in a full employment economy is inflationary. As benefits and tax rates are set in money terms, inflation

erodes their real value. As the inflationary thrust dies out a new equilibrium is reached. Its characteristics need to be known.

Price stability may be a major or overriding policy goal perhaps because of a commitment to fixed exchange rates. Monetary and fiscal policy may be used to offset the inflationary tendencies. The new equilibrium with these policy goals needs to be determined.

(1) Distributional Effects

The introduction of a meaningful negative income tax shifts the consumption and liquidity preference functions so that excess aggregate demand appears. Simultaneously the labor supply function shifts so that labor supplied by families with incomes in the neighbourhood of the median decreases at the same time as labor supplied by welfare families increases. If no explicit offsetting steps are taken an inflationary expansion will take place. What will be the nature of the equilibrium after the inflationary pressures are exhausted? The possibility of an investment boom, with the result that business cycles are triggered, is ignored.

Initially benefits in the form of increases in disposable income and the valuable assurance of a minimum income are widespread. Only families which have high incomes and substantial net worths are worse off, and this is a conscious policy choice. Even so our model scheme has a maximum to the decline in money income for a family (\$500 in the example).

As money wages rise, families pass from being net beneficiaries to being net tax payers. As prices rise the real value of the transfers and the insurance features decline, as does the real value of the maximum additional tax any household pays.

Let us assume that initially the budget is balanced and throughout the inflationary period the budget for items other than the negative income tax remains balanced. The decline in benefits and the increase in receipts on account of the negative income tax that accompanies the rise in wages means that a surplus develops, and this surplus increases as long as wages rise.

Both the rise in prices and in wage incomes erode the real benefits of the negative income tax. As a result the labor supply consumption and liquidity preference functions drift back toward their initial position, therefore increasing aggregate supply and decreasing aggregate demand. The emerging surplus also tends to decrease demand. Excess aggregate demand will

be eliminated before inflation completely wipes out the distributional effect of the negative income tax. There will be some residual improvement in the income of the lowest income groups and the protection embodied in the law will still be worth something to some proportion of the population with incomes in the neighbourhood of the old median income. However families who initially took the maximum possible decline in nominal income find that the decline in real income is smaller than anticipated.

Inasmuch as the initial change is only partially eroded by the inflation only part of the initial decline in aggregate supply will be offset. The initial impact upon liquidity preference will tend to increase investment, the initial impact upon consumption will tend to decrease investment. A priori it is not possible to argue which dominates, this depends upon the behavior of the investment function and the way in which other policy instruments are used. It is best to examine the impact upon the rate of growth in the context of an examination of policy goals.

(2) Price Stability

If a negative income tax sets off inflationary pressures and if the ultimate equilibrium is characterized by 1) the poor receiving a positive net benefit smaller than intended, 2) a larger group of losers than intended and 3) a budgetary surplus, then a more modest negative income tax combined with a planned budget surplus could have achieved the same real result without the price increases. The more generous the negative income tax scheme, the greater the required surplus, thus in principal there exists a tax scheme such that real transfers can be as large as desired. However higher tax rates mean greater withdrawals from the labor market. The possibility exists that the rise in tax rates may have a greater effect in reducing supply than in reducing demand: a maximum to the amount that can be transferred exists.

For inflation to exist in spite of fiscal constraint, monetary ease is necessary. The impact of a negative income tax upon the liquidity preference function is conducive to monetary ease. Thus an offsetting constraint in the rate of growth of money is necessary. This implies high interest rates and a low rate of investment.

If we recognize that the price stability goal is often the by product of a balance of payments constraint, and if we assume that there is some limits

to the fiscal constraint that can be operative then a considerable part of the anti-inflationary burden needs to be carried by monetary policy. This implies that investment is constrained, which in turn implies a low rate of growth.

E. Conclusions

The negative income tax has been proposed as an effective straight forward weapon for the eradication of poverty. It is in truth a complex instrument, and its use may lead to unintended and undesirable side effects. In particular a negative income tax may tend to induce inflation, reduce measured gross national product and lower the measured rate of growth of the economy. As the induced inflation works its way through the economy the real disposable income of families with quite modest incomes will decline and the net benefits to the intended beneficiaries will be eroded.

These repercussions follow from the higher marginal tax rates on quite modest incomes leading to a withdrawal of some labor from the market and from the value of the guarantees embodied in the scheme, to families that may not directly benefit inducing increased consumption and more adventuresome portfolios. Whether the induced inflation will be rapid and large or slow and small is not known and would be difficult to estimate. If the induced inflation is slow and small, and if one believes that experience with higher real incomes will integrate the present disadvantaged and poor into society, then the undesirable side effects can perhaps be endured. If the net gains to the present poor will evaporate quickly and almost completely and if the residual gain of the poor is mainly at the expense of the slightly better off, then the costs of a negative income tax might far outweigh its benefits.

It is worth noting that the macroeconomic effects of previous improvements in welfare systems have not been adequately studied. Britain experienced a large rise in its welfare and social services system after World War II. The past twenty years have been years of inflationary pressures and slow growth. The improvement in welfare schemes in the United States following the election of 1964 ushered in a period of price inflation which has proven to be resistant to monetary and fiscal measures. Of course other events such as Britain's war time debts and the Vietnam war have been factors in creating these situations.

However the general point of the argument is valid: far reaching schemes

must be subject to a critical examination in order to ascertain their system wide effects and all too often schemes which have general system wide effects are adopted and examined on the assumption that they have only local, particular effects. The design and evaluation of policy instruments must take into account both the direct impact upon the problem being attacked and system wide effects. In this paper it has been argued that the system wide effects of a negative income tax are such as to cast doubts as to its ability to deliver the benefits claimed for the scheme.

Footnotes

- (1) Christopher Green, Negative Taxes and the Poverty Problem. (The Brookings Institution, Washington D.C., 1967) examines various negative income tax and social dividend proposals.

Peter Diamond, Negative Taxes and the Poverty Problem. A Review Article, National Tax Journal, Vol. XXI, No.3, pp. 288-302, reviews Christopher Green's book and examines the labor market disincentive effects of negative income taxes.

- (2) The various suggestions run from a low minimum of \$1,500 (Friedman and Lachman) to a high minimum of \$3,200 (Yale plan). For a description of Friedman's and Lachman's plans see James C. Vadakin, "A Critique of the Guaranteed Annual Income", Public Interest, Spring 1968. The Yale scheme takes the form of a model tax law. See A Model Negative Income Tax Statute, Yale Law Journal, December 1968.
- (3) It is possible to favor a negative income tax on the general philosophical ground that the decision maker in each household knows best how to maximize the satisfaction received from the resources available to it. Thus the provision of income in kind to both the poor and the non-poor is objectionable - whether the income in kind be schools, medical care, subsidized housing or services of the police, courts and fire departments. Such market anarchism ignores or minimizes the significance of externalities, such as my being better off if your children are both vaccinated and educated, and the existence of community - or civilized - standards so one would gladly sacrifice ones private consumption for anothers safety on the street. The arguments for the maximum of such "freedom" as well as a recognition of some of its limits are in M. Friedman, "Capitalism and Freedom" (Chicago 1967) and H. Simons, "A Positive Program for Laissez-Faire" in Economic Policy for a Free Society (Chicago 1948).
- (4) Any standard textbook on Macroeconomics, such as Ackley, G., Macroeconomic Theory (New York, 1961), has an exposition of the basic model. Fundamentally the class of models builds on J. Hicks, "Mr. Keynes and the 'Classics'. A Suggested Interpretation" originally published in Econometrica and since reprinted in many volumes.

Recently the validity of this view of the Keynesian model has been

questioned by Clower, R., "The Keynesian Counterrevolution: A Theoretical Appraisal" in Hahn, F.H. and Brechling, F.D.R. (eds.) The Theory of Interest Rates (New York, 1965), Leijonhufvud, Axel, On Keynesian Economics and the Economics of Keynes (New York, 1968) and Minsky, H.P. "Private Sector Asset Management and the Effectiveness of Monetary Policy: Theory and Practice", Journal of Finance, May, 1969.

For the meaning of uncertainty in the context of Keynesian economics see Keynes, J.R., The General Theory of Employment, Interest and Money (New York, 1936) Chapter 17 and J.R. Keynes, "The General Theory of Employment", Quarterly Journal of Economics, February, 1937.

- (5) Orcott, G.H. and Orcott, A.G. "Incentive and Disincentive Experimentation for Income Maintenance Policy Purposes", American Economic Review, September 1968.
- (6) For the economics of risk-aversion and the impact of uncertainty upon the organization of activity see Friedman, M. and Savage, L.J., "The Utility Analysis of Choices Involving Risk", Journal of Political Economy, August 1948, Arrow, K., "Uncertainty and the Welfare Economics of Medical Care", American Economic Review, December 1963, and Arrow, K. Aspects of the Theory of Risk Bearing, Yrjo Jahnsson Lectures, Yrjo Janssonin Säätiö, Helsinki, 1965. Diamond, Peter (op. cit.) examines the impact of a negative income tax on saving via its effect upon uncertainty.
- (7) Note that the consumption function does not include a real balance effect, i.e. $V \neq \frac{K}{p} + \frac{M}{p}$ where M is the amount of outside money in existence. Such an effect could be introduced but it would be irrelevant to our basic problem. For an exposition of the real balance effect see Patinkin, D., Money, Interest and Prices (New York, 2nd Edition, 1965). The models examined here can be interpreted as treating the welfare systems impact upon consumption in a way that is analagous to Patinkin's treatment of money.