A One Parameter Earned Income Tax Credit

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As a companion to a one parameter graduated expenditure tax, we here describe a one parameter version of the earned income tax credit, only in this case the marginal tax credits that apply to successive units of earned income form a *geometric* as opposed to an *arithmetic* sequence (differ by a common *ratio* as opposed to a common *sum*).

Thus for a given unit of currency, let ϵ be a very small number of order 10^{-5}. We then define $1 - \epsilon$ to be the tax credit a wage worker receives for the first unit of currency he earns in a given tax period, $(1 - \epsilon)^2$ the credit he receives for the second unit of currency earned, $(1 - \epsilon)^3$ the credit for the third unit, and so on. It is then a simple matter to compute a wage worker's total tax credit for that period using the formula for the sum of a geometric sequence that we all learned in high school, namely,

$$t_{cr}^{n} = \left[(1 - \epsilon) - (1 - \epsilon)^{n+1}\right] \div \epsilon$$

where t_{cr}^{n} denotes the total credit on n units of wages received.

To get a sense of what this version of an earned income tax credit would look like in practice, consider the United States as it exists today. Here the unit of currency is the dollar and for purposes of illustration we choose the parameter ϵ to be exactly 5×10^{-5}. The table and chart below show what the total credits would be, both absolutely and as a percentage of wages, for workers earning between $5000 and $100,000 a year.

Discussion

The first thing we note is that the lower a wage worker's total earnings the larger his tax credit will be as a percentage of his wages. In this it is like the current EITC and is in keeping with the purpose of an earned income tax credit, which is to enable low income workers to enjoy significantly higher standards of living than their market wages alone can support.

On the other hand, we also note an anomaly: unlike today, workers whose total earnings are the highest, and who presumably are least in need of a wage subsidy, would in fact receive

the biggest credits in absolute amount. There is no threshold beyond which the size of their credits begins to decline.

This anomaly can be reduced, however, and in some cases eliminated entirely, if we assume that there is also in place a one parameter graduated expenditure tax like the one we previously constructed. For two reasons:

First, because as a rule workers who earn more will also consume more and will therefore face higher marginal tax rates on any portion of their total tax credit they choose to spend in order to further increase their total consumption. Thus even though the size of their total credit would be larger absolutely, its after-tax purchasing power in the current tax period (and quite likely in future tax periods as well) would be less, in some cases much less.

And second, because additional revenue will have to be raised in order to finance this (or any) system of earned income tax credits, which means that the parameter ***m*** would have to be dialed up by the taxing authority, thereby raising the marginal tax rates on each dollar of personal consumption. And since by definition those rates increase arithmetically over the entire range of consumer spending, workers whose earnings are too high will as a rule voluntarily prefer or (if their propensities to save are too low, but not less than zero) actually be forced to consume less than they did before the system of credits became law. For them "what the right hand giveth, the left hand taketh away."

Or to put it another way, for any value of the small number ϵ there exists an earnings threshold, call it point **p**, beyond which every wage worker's disposable income becomes less even after receiving his credit. Where that threshold lies is an empirical question the answer to which will vary depending upon a given society's distributions of income and wealth, the distribution of its propensities to consume, and the revenues it requires for other public purposes. Without any data the most we can say is that, with any given set of these four variables being held constant, the closer the parameter ϵ is to zero the higher the parameter ***m*** must be set, and the lower that threshold will be.

We leave it to mathematical economists to describe the range of possible Gini coefficients of consumption in a society as a function of these variables.

Tax Credit Table for e = 5 x 10^-5

Earnings	Tax Credit	Credit as % of Earnings
$5,000	$4,424	88%
$10,000	$7,869	79%
$20,000	$12,642	63%

$30,000	$15,537	52%
$40,000	$17,203	43%
$50,000	$18,357	37%
$60,000	$19,003	32%
$70,000	$19,395	28%
$80,000	$19,633	25%
$90,000	$19,777	22%
$100,000	$19,864	20%