ECONOMIC DEPRECIATION:
THE IMPOSSIBLE DREAM

Paper Presented to
Western Economic Association
Fifty-fourth Annual Conference
Las Vegas, Nevada

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June 18, 1979

President Carter's January 1978 tax reform program included a proposal

for substantially changing the provisions pertaining to depreciation of real property.

Far more significant than the proposed changes themselves was the rationale

advanced for the changes. While the proposal was given short shrift in the legislative

process, the question of the "correct" tax treatment of depreciation was not finally

disposed of. This question is likely to come alive in the second session of the

present Congress. Depreciation for tax purposes is very much a continuing issue

of tax policy.

Unlike a number of other questions in tax policy, the issue regarding depreciation

is clearly joined. On the one hand, there are those who hold that the correct tax

treatment requires use of the closest possible approximation of so-called "true"

or "economic" depreciation. Economic depreciation is defined as the expected

reduction, between two points in time, in the present value of the quasi rents

an asset is expected to produce over its remaining "life." Depreciation allowed

for tax purposes, it is widely claimed, differs materially from economic depreciation

because the former (1) is based on unrealistically short useful lives and (2) except

for certain classes of property, is computed on the basis of formulae which accelerate

the tax deductions compared with the actual pattern of value loss. In effect,

it is alleged, this difference provides owners of such property interest-free loans

of the taxes which should be paid earlier than in fact they are.

At the opposite side are those who maintain that income tax neutrality requires expensing of capital outlays, that requiring the extended write-off of capital outlays imposes a tax bias against saving channeled into durable but exhaustible capital, and that "true" or "economic" depreciation, however useful as an analytical abstraction, is an impossibility for any practical purpose.

My discussion addresses these conflicting views with particular attention to the last question -- that of the implementing for tax purposes of the economic concept of depreciation.

I.   Expensing vs. Depreciation: The Neutrality Aspect

The initial aspect of the issue to be addressed pertains to identification of neutral income tax treatment of the amount invested in "depreciable" capital, i.e., capital which may be used for more than one operating period, which loses its productivity through use, and which is reproducible. The issue is addressed at two levels. The primary neutrality question is how to treat saving -- the purchase of sources of future income streams -- so as to insure that the income tax does not increase the cost of saving disproportionately with the cost of current consumption. The secondary neutrality question is how to treat outlays for capital to insure that the tax does not differentially change the value of diverse units of capital.

A.   The primary neutrality question

A simple and rigorous way of assessing the effect of an income tax on the cost of acquiring or holding capital -- the source of future income -- relative to the cost of consumption is to compare the percentage reduction in consumption with the percentage reduction in future income which can be acquired with a dollar of pretax income after an income tax is levied. To take a simple example,

suppose that absent a tax, one can obtain a perpetual income stream of, say, $.10

if $1.00 of current income is used to buy a unit of capital instead of $1.00 of consumption

goods. Now, impose an income tax at a rate of, say, 50 percent. With the tax,

$1.00 of income now buys $.50 of consumption goods or a perpetual income stream

of $.025: the $1.00 of pretax income is reduced to $.50 by the tax; invested in

the same asset at the same yield, it provides $.05 of pretax income which is

in turn taxed, leaving $.025 as the available income. The tax, thus, reduces the

amount of future income obtainable with $1.00 of pretax income twice as much

as it reduces the amount of current consumption. Equivalently, the tax doubles

the cost -- the required amount of current pretax income -- of consumption, but

quadruples the cost of any given amount of available future income. Hence, the

tax doubles the cost of future income compared with that of current consumption.

A formal proof is afforded by setting the cost -- P -- of a source of future

income, absent the income tax, equal to the present value of the stream of quasi

rents which the source will provide, i.e.,

I. $\quad P \quad = \quad \sum_{i=0}^{N} Y_i^*$, where

Y_i^* = the present value of the quasi rent in year i, and

N = the number of years during which the capital will be held.

Clearly, P is the amount of current consumption foregone to acquire the future

income.

With an income tax at rate t, to obtain the same future income stream (assuming

no change in the real yield of the capital) requires saving $\dfrac{P}{1-t}$ of pretax income.

But the quasi rents provided by the capital are also taxed under an income tax

of the present configuration. Hence,

II. $\quad \dfrac{P}{1-t} \rightarrow \sum_{i=0}^{N} Y_i^* (1-t)$; equivalently, P dollars will buy an after-tax stream

of future income $= \sum_{i=0}^{N} Y_i^* (1-t)^2$, and to have $\sum_{i=0}^{N} Y_i^*$ requires $\frac{P}{(1-t)^2}$ of pretax income. On the other hand, to have P dollars of current consumption requires $\frac{P}{1-t}$ dollars of pretax income. Then the income tax increases the cost of saving relative to the cost of consumption by $\frac{P}{(1-t)^2} \Big/ \frac{P}{(1-t)}$ or by $\frac{1}{(1-t)}$.

Where the future income is provided by depreciable capital, the availability of depreciation allowances for tax purposes ameliorates this income tax bias against saving in varying degree, depending on how rapidly the amount invested may be written off. The bias remains in some degree, however, so long as the present value of depreciation and any other capital recovery allowance is less than the amount invested.

Notationally, under the present tax law,

III. $\frac{P}{1-t} \longrightarrow \sum_{i=0}^{N} Y_i^* (1-t) + \sum_{i=0}^{M} tD_i^*$, or

III-A. $\frac{P}{(1-t)^2} - \frac{\sum_{i=0}^{M} tD_i^*}{(1-t)} \longrightarrow \sum_{i=0}^{N} Y_i^*$, where

M $\quad = \quad$ the number of years over which depreciation deductions must be allocated for tax purposes, and

$D_i \quad = \quad$ the present value of the depreciation deduction in year i.

If $\Sigma D = P$ and $M > 0$, then $\sum_{i=0}^{M} D_i^* < P$, and the tax increases the cost of saving relative to consumption.

In the general case, neutrality may be achieved either by excluding the amount invested from current taxable income while taxing the gross quasi rents (including the proceeds from any ultimate disposition of the capital), or by including the amount saved and invested in current taxable income but fully excluding from tax all of the quasi rents. Thus, with expensing in lieu of depreciation, the net outlay required to obtain pretax future income of $\sum_{i=0}^{N} Y_i^*$ would be P -tP. To have this amount after taxes would require P of pretax income:

IV. $\dfrac{P - tP}{(1-t)} \longrightarrow \displaystyle\sum_{i=0}^{N} Y_i^{*} \ (1-t)$, or

IV-A. $P \longrightarrow \displaystyle\sum_{i=0}^{N} Y_i^{*} \ (1-t)$, or

IV-B. $\dfrac{P}{(1-t)} \longrightarrow \displaystyle\sum_{i=0}^{N} Y_i^{*}.$ [1]

The use of economic depreciation -- indeed, of any depreciation method
-- locks in this income tax bias against saving and in favor of current consumption.
With respect to this primary income tax unneutrality, it is clear, the considerations
advanced in the conventional view for using economic depreciation for tax purposes
are irrevelant. Unless immediate expensing of saving is allowed, the only valid
generalization is that the more rapid the depreciation -- i.e., the greater the proportion
of the saving or investment which may be charged against income in the early
years of the capital unit's "life" -- the less the tax bias against saving.

The standard objection to this position is that, in effect, it calls for replacing
the income tax with an expenditure tax. The objection, however is more a matter
of nomenclature than of substance. Nothing in the concept of income for income
tax purposes requires including in the tax base both the annual return generated
by capital and the capitalized amount of those returns. Instant expensing of saving
is one route toward assuring neutral <u>income</u> tax treatment of consumption and
saving uses of income.

B.   The secondary neutrality question

Suppose, however, we are constrained to the conventional income

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[1] For a more detailed and extended discussion of the basic income tax bias
against saving and of alternative tax changes to alleviate this bias, see Norman
B. Ture and B. Kenneth Sanden, <u>The Effects of Tax Policy on Capital Formation,</u>
Financial Executives Research Foundation, (New York; 1977), especially chapters
II and III.

tax view. This focuses attention on the secondary neutrality question of the tax treatment of differing types of capital required to assure that the tax reduces the value of diverse capital units in the same proportion.

The preponderance of professional opinion holds that if the income produced by the use of such capital is to be accurately measured for income tax purposes, the correct concept of the depreciation sustained on the capital must be measured and deducted from the gross income attributable to the capital. In this view, any deviation of measured depreciation from the conceptually correct amount results in under- or overstatement of taxable income in an extent which is likely to vary from firm to firm, hence to result in imposing differing real tax rates among them. Moreover, these differences are likely to be associated with diverse types of capital and their "useful lives," so that failure to measure conceptually correct depreciation, it is maintained, results in a tax bias with respect to particular kinds of capital.

This view is challenged at two levels. At one level, the practical possibility of measuring conceptually correct depreciation is seriously questioned; as a corollary, the gain in neutrality from attempting to do so is challenged. This question is examined subsequently. The more basic challenge pertains to whether any depreciation system can provide tax neutrality in the sense that the tax alters the value of different types of capital in the same proportion.

The view that conceptually correct depreciation assures income tax neutrality is based on the implicit -- and unreal -- assumption of perfectly homogeneous capital. In fact, given any differences in the physical attributes and uses of capital such that there are differences in the time paths of the quasi rents different units of capital produce, the use of conceptually correct depreciation assures nonneutrality

of the income tax among types of capital. That is to say, the application of a

flat rate of tax to net income, defined as quasi rents less economic depreciation,

differentially alters the present value of the stream of after-tax quasi rents of

different kinds of capital compared with the relative prices of these capital types

in the absence of the tax. A cursory glance at the simplest notational statement

of the present value of the quasi rent stream shows why this is so.

Absent any income tax, the value -- P -- of the asset at any point in time

is the present value of the expected remaining quasi rents, is shown in equation

I, above. With an income tax imposed at rate t, the value of the asset at any

point in time is the present value of the expected remaining quasi rents less the

tax on each such quasi rent plus the tax value of any capital recovery or depreciation

deduction allowed for tax purposes. This is expressed as

V. $P_t = \sum_{i=0}^{N} \left[Y_i^* (1-t) + t D_i^* \right]$, where D^* = the present value of

the economic depreciation expected in year i. [2/] The difference between V. and

I. is, then, $t \left[\sum_{i=0}^{N} (D_i^* - Y_i^*) \right]$, and the percentage change in the value of

the capital resulting from the imposition of the tax is

VI. $\dfrac{P_t - P}{P} = t \left[\dfrac{\sum_{i=0}^{N} D_i^*}{\sum_{i=0}^{N} Y_i^*} - 1 \right]$.

Consider any two units of capital with the same value at a given point in

time, absent income taxation, but with differing time paths of expected quasi

rents. Since the amount of economic depreciation in any year is a function of

the time path of the remaining quasi rents, differences between the capital units

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[2/] Economic depreciation in any year i may be stated as $D_i = \sum_{i=0}^{N} Y_i^* - \sum_{i=1}^{N} Y_i^*$.

in the time paths of the quasi rents means differences in the time paths of the

economic depreciation. Since the undiscounted sum of the economic depreciation

amounts of each asset is equal to the present value of its quasi rents, hence is

the same for both units, the differences in their time paths means that the present

values of the depreciation streams of the two units must differ. But then, with

the application of the income tax, the percentage changes in the values of the

two units of capital must differ. Hence, the use of economic depreciation means

that the tax will disproportionately affect the value of differing units of capital,

i.e., insures that the tax will not be neutral.

The view that economic depreciation must be accurately measured and employed

to compute taxable income in order to insure income tax neutrality among diverse

types of capital rests upon a misperception of the neutrality criterion. This view

assays neutrality in terms of equality of percentage reduction in "correctly" measured

net income. But it is quickly seen that equal percentage reductions in net income,

effected by an income tax and economic depreciation, result in unequal percentage

reductions in the values of the diverse units of capital. And it is the equality

or inequality of the effects of the tax on the values of diverse types of capital

which measure the secondary neutrality or nonneutrality of the tax.

The conclusion that economic depreciation assures nonneutrality of the

income tax with respect to different units of capital derives from the measure

of economic depreciation which would occur in the absence of the tax. The question,

then, is whether using economic depreciation determined with respect to after-

tax quasi rents alters this conclusion.

Unfortunately, there is a major impediment in the way of finding an answer

to this question. The value of a unit of capital at any time when an income tax

applies is the capitalized amount of the remaining after-tax quasi rents. Accordingly, the amount of the depreciation for any given period depends on the amount of tax to be paid on the pretax quasi rents in each period. But the amount of the tax depends in part on the amount of the depreciation. While a simultaneous or recursive solution can be obtained, the difficulties of either procedure would pose a well-nigh impossible problem for taxpayers, particularly in connection with long-lived property (remember that the economic depreciation for any given year requires determination of the after-tax quasi rent, hence depreciation, for each of the remaining years). As a practical matter, the requirement that depreciation for tax purposes be economic depreciation based on after-tax quasi rents would confront the taxpayer with a dilemma he could not readily resolve.

Putting aside this computational difficulty, we find that, as before, the use of economic depreciation based on after-tax quasi rents differentially changes the value of diverse units of capital, hence does not satisfy the neutrality condition.[3]

The view that economic depreciation must be used in the determination of taxable income in order to assure income tax neutrality among types and units of capital is analytically mistaken. It cannot, therefore, serve as a basis for evaluating the rightness or wrongness of any depreciation method actually used for tax purposes. The conventional view that the present-law accelerated depreciation formulae, such as double declining balance or sum-of-the-years' digits methods, constitute "tax expenditures" is without merit.

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[3] An easy way of seeing this is to advert to the notational exposition above and read D_i^* as the present value of depreciation in period i where D_i^* is derived from capitalization of after-tax quasi rents. The rest of the proof is as before.

Instant expensing of amounts saved and invested assures income tax neutrality among diverse capital units. With expensing, there is an immediate reduction, equal to tP_t, in the amount of pretax income required to obtain the given amount of future income. Thus, analagous to II, above,

$$\text{VII.} \quad \frac{P_t - tP_t}{1 - t} = \sum_{i=0}^{N} Y_i^* (1-t), \text{ or}$$

$$P_t = \sum_{i=0}^{N} Y_i^* (1-t).$$

The percentage change in the value of any asset resulting from the tax with expensing, then, is

$$\text{VIII.} \quad \frac{P_t - P}{P} = \frac{\sum_{i=0}^{N} Y_i^*(1-t) - \sum_{i=0}^{N} Y_i^*}{\sum_{i=0}^{N} Y_i^*}$$

$$= -t.$$

As is readily seen, expensing reduces the present value of any capital unit in the same percentage as the income tax rate. It affords neutrality, therefore, both in the primary and secondary terms, i.e., with respect to the relative costs of saving and consumption and with respect to the reduction in the values of diverse capital units. Insofar as neutrality is deemed to be an important criterion, therefore, durable but exhaustible capital should be expensed, not depreciated, for tax purposes. Economic depreciation does not conform with the requirements of the relevant neutrality concepts.

II.   The Feasibility of Economic Depreciation

Neutrality considerations, in truth, appear to weigh lightly in tax policy. More importance is attached to equity considerations, despite the fact that these,

in contrast with neutrality, defy rigorous delineation. The argument for the use of "economic depreciation" for tax purposes, however, makes more sense on equity than on neutrality grounds.

The latter criterion, as we have seen, rejects economic depreciation. But if neutrality is set aside, one might argue that fairness in an income tax requires income to be accurately measured and that insofar as income is, in whole or in part, produced by depreciable capital, depreciation for tax purposes must be economic depreciation.

If this premise is accepted, the concern then must be with the feasibility of measuring economic depreciation for tax purposes for each firm with respect to each substantially homogeneous group of property it holds. Obviously, the only purpose to be served by the use of economic depreciation is to particularize depreciation deductions to each firm and to the capital it holds. Clearly, this purpose is not served by any convention regarding depreciation. Accordingly, averages of useful lives of various broad classes of property held by more than one taxpayer or patterns of depreciation deemed to be common to various classes of property are not relevant or useful determinations to be made. If economic depreciation is to be used in order to measure the actual net income generated by the particular capital in the particular uses to which such capital is put by particular taxpayers, it must be determined on a taxpayer-by-taxpayer, capital-by-capital basis. If any conventional system is to be applied, whether or not guided by findings of investigations of average useful lives or typical depreciation patterns, there is no occasion for concern with economic depreciation. Any write-off convention is as good as any other; the choice among such conventions is a matter of the overall tax rate to be applied to income produced by depreciable capital. The

reason for concern with economic depreciation in the interests of equity, to repeat, is to provide an accurate measurement of net income of each taxpayer with respect to the particular use each taxpayer makes of particular capital.

The determination of economic depreciation sustained on particular assets in particular uses by particular taxpayers poses enormous difficulties. These difficulties derive from the very concept of economic depreciation -- the loss between two points in time in the present value of the remaining stream of quasi rents produced by the asset.

Consider what must be known to determine the amount of economic depreciation sustained -- or more precisely, expected to be sustained -- in any given period of time: (1) the amount of the quasi rent expected to be produced in each ensuing year the asset is held by the taxpayer; (2) the salvage value or proceeds from disposition of the asset; (3) the number of remaining years the asset will be held; (4) the tax rate and any and all other tax provisions which bear on the amount of tax which will be payable on each of the remaining year's quasi rents; and (5) the rate at which future receipts and outlays are appropriately to be discounted to find their present values. Lacking accurate measures of each of these variables, economic depreciation for any period cannot be accurately determined. But less than precise measurement of economic depreciation gainsays the very reason for insisting on its use rather than use of any depreciation convention.

The first of these elements in the determination of economic depreciation -- the expected amount of quasi rents over the remaining life of the asset -- itself depends on a number of factors. These include the production function governing the use of the asset, the conditions of demand for the output to the production of which the asset contributes, the conditions of supply, hence the prices, of the

other production inputs with which the asset is combined in the production process, certain physical attributes built into the asset which influence its production efficiency, and the extent and character of maintenance and repair of the asset. Unless it is assumed, contrary to fact, that each unit of capital is specialized to a particular production methodology and process, the quasi rents in any year which different units of a given capital of the same vintage are expected to produce are likely to differ, often widely, depending on the use to which the different units are put. As a corollary, with the same type of capital used in differing production functions, changes in the supply prices of the diverse other production inputs with which the capital units are used will result in differing changes in these capital-other input ratios, hence in differing changes in the marginal value products -- quasi rents — of the differing units of the capital. And differing changes in production technology will also differentially affect the quasi rents produced by diverse units of the capital. Even more obvious, changes in the conditions of demand for the output of the capital in its diverse uses are also likely to differ widely, resulting in substantially different changes in the quasi rents expected to be produced by different units of a given type of capital in its diverse uses.

All of these factors are likely to exert differing influences on the quasi rents of like capital not only from one taxpayer to another, but as well for any one taxpayer from one period of time to another. Thus, the past experience of any given taxpayer with any given type of capital is likely to provide only the flimsiest sort of guide as to future quasi rents expected to be afforded by the same sort of capital. And the experience of other taxpayers with such capital is likely to be still less useful as a basis for expectations about future quasi rents.

Apart from these factors, variations in the physical properties of the diverse

units of a given kind of capital are also certain to contribute to variance in the quasi rents the differing units produce even in identical uses. Few production processes result in perfectly identical units of output; the physical characteristics of differing units of a given kind of capital instrument are likely to vary at least in some degree; so, too, is their physical productivity likely to differ.

A collateral source of variance in the quasi rents afforded by a given type of capital is the difference in repair and maintenance policies among taxpayers and at varying times for any taxpayer. In general, the less the maintenance and repair, the more rapid and substantial will be the decrease in an asset's productivity, hence in the quasi rents it produces, But since repair and maintenance require the firm to use up some of its resources, there is a trade-off between the cost of repair and maintenance and loss of capital value. No maintenance and repair practice is uniquely associated, therefore, with any particular asset. These practices, accordingly, are likely to vary from firm to firm and within the firm, among assets and from time to time. If for no other reason, the time path of quasi rents produced by any given type of capital is likely to be variable; economic depreciation, by the same token, is likely to vary for any firm with respect to any given type of capital from time to time and from firm to firm at any given time.

Determination of salvage value or proceeds from disposition of the capital unit is appropriately regarded as a problem of determining the capital's quasi rent in its terminal income period. The problem is a particularly difficult one because its solution requires the present owner of the capital to determine not only how his expected use of it, including his repair and maintenance practices, will affect its productivity year by year from the present point in time, but also to determine how the conditions of demand for the capital's output in all of its

varied uses and the differing supply conditions for other production inputs with which it is combined in the differing production functions in its other uses will affect its value to other firms. The variance in salvage value of a given type of capital, accordingly, is likely to be substantial. The consequence of this substantial variance for the precision with which economic depreciation for any year may be computed are obvious.

The conventional analysis of depreciation assumes known annual quasi rents and a determinant "useful life" of given types of capital. In fact, as shown, annual quasi rents are likely to very substantially from unit to unit, owner to owner, and time to time. Equally variable is the number of periods over which it will pay to keep the capital unit in use; useful life, in fact, is an endogenous variable in the depreciation function.

It will pay the firm to keep a unit of capital in use so long as the quasi rent it is expected to produce, less the reduction in the present value of the expected remaining quasi rents, exceeds the quasi rent that might be obtained by disposing of the unit, through sale or by scrapping, and investing the proceeds in some other capital. Useful life, accordingly, is not an attribute which inheres in any unit of capital; on the contrary, it is a function of the time distribution of the expected quasi rents obtainable from the unit of capital as used by the firm compared with the quasi rents which might be obtained from alternative capital units. Useful life, therefore, depends on all of the factors so far discussed which period by period affect this present value of the quasi rents afforded by the capital unit.

It was pointed out earlier in this discussion that where an income tax is imposed, economic depreciation is the change in the capitalized amount of after-tax quasi rents. Accordingly, economic depreciation cannot be determined independently

of the provisions of the tax system which determine the amount of tax liability

on the quasi rents. The applicability of these provisions, moreover, is likely to

be significantly differentiated by specific taxpayer attributes. It follows, therefore,

that the tax system itself is an important source of variability among taxpayers

in the economic depreciation which would be sustained on any unit of capital.

And since the tax system changes significantly over time, it is itself a major source

of variance in economic depreciation from period to period, as well as from taxpayer

to taxpayer.

Finally, the discount rate to be used in capitalizing after-tax quasi rent

streams is variable and, accordingly, a source of variation in economic depreciation

from time to time and among firms. The discount rate the firm should use in

capitalizing nominal, after-tax quasi rents is a measure of its real opportunity

cost plus a premium for any inflation it anticipates. Assuming efficient capital

markets, the firm's real opportunity cost will closely approximate the weighted

mean marginal value product of capital less the weighted mean income tax liability

on this marginal return, plus the expected inflation rate. Although a substantial

degree of stability may be properly attributed to the first of these factors, no

realistic assessment of the economy would support the view of a stable rate of

increase in the price level or of a stable marginal tax rate. If for no other reason,

then, economic depreciation is likely to be highly variable through time and among

firms by reason of the instability of the appropriate discount rate to be used in

determining the present value of after-tax quasi rents.

The difficulties in determining economic depreciation delineated in this

part of the discussion ostensibly could be circumvented if the measure employed

were based on the market prices of capital units rather than on the firm's valuation

of expected after-tax quasi rents. There are, however, major reservations about this approach.

One problem, of a purely practical nature, is to establish reliable samples of homogeneous capital units in substantially homogeneous markets in order to determine how market prices of given capital units change through time. As already indicated, however, units of a given type of capital are not likely to be homogeneous in relevant respects, i.e., the production processes and functions in which they are used are not likely to be substantially identical, nor are the factor proportions, the outputs, or the conditions of demand for these outputs. Similarly, the markets in which the capital units are exchanged are not likely to be substantially identical, but are more likely to reflect substantial variations in fundamental economic circumstances. Real property markets, to take an obvious example, differ widely from California to Maine. If no other problems were confronted, these attributes of heterogeneity of the capital units and of the market place are sufficient to preclude any ready generalization about the pattern of value loss of various types of capital. Moreover, even were this consideration ignored, the depreciation formulae which would emerge from analysis of market prices would have no necessary bearing on the experience of any specific taxpayer with the particular capital in the particular uses of the taxpayer. In other words, depreciation so derived would be conventionalized rather than particularized depreciation; as such, it would not serve the purposes for which economic depreciation is advocated.

A more fundamental objection is that market prices almost certainly must afford biased measures of changes in capitalized amounts of expected after-tax quasi rents. For the most part, the sale of "used" physical capital entails not only significant transaction costs but also substantial costs of removal, transportation,

installation, and start-up. Clearly, the present owner of any given unit of capital will not sell it if the present value to him of its expected after-tax quasi rents exceeds the after-tax sale proceeds net of any part of these transaction and other costs he must bear, By the same token, any buyer must expect to obtain from use of the capital after-tax quasi rents the present value of which must at least equal the price plus any fraction of the transaction and associated costs he must assume. Given these costs, it follows that the expected remaining after-tax quasi rents of the capital in the hands of the present owner must be less than those in the hands of the potential buyer. Sales prices, accordingly, must exceed the present value of the after-tax quasi rents in the hands of the present owner. By the same token, the period-to-period loss in the present value of the after-tax quasi rents of the capital in the hands of the owner must be greater than that measured by the differences in market prices. Market prices, therefore, must understate the depreciation expected with respect to capital units that are retained by their existing owners.

Moreover, since transactions in used capital units must occur between non-homogeneous taxpayers, the market prices at which the transactions take place cannot measure the change in value of the capital for present owners. Whatever other purposes this market price information may serve, it cannot afford the basis for computing economic depreciation particularized to specific taxpayers and their specific uses of specific units of capital. Since economic depreciation can be justified only insofar as it affords this particularization, market price data cannot be used for this purpose.

III.   Conclusion

The conclusion which emerges from examination of these considerations

is that whatever its utility in abstract economic analysis, economic depreciation has no corresponding virtues as part of an income tax. Rather than providing neutrality among diverse types of capital, economic depreciation would insure that the income tax would differentially affect their values. It would, moreover, also insure the income tax bias against saving and capital formation and in favor of consumption.

Apart from these considerations, however, economic depreciation simply is not practicable. The determinants of the change in the value of a capital unit are so varied from firm to firm, capital to capital, and time to time as to preclude ready and confident calculation by any firm. Market prices afford consistently understated measures of the change in capital values, even ignoring the problems presented by the heterogeneity of capital, taxpayers, and markets.

There is, indeed, much to be done to improve business income taxation in the interests of reducing tax impediments to efficient allocation of resources between consumption and capital formation uses and among diverse types of capital. The concept of economic depreciation, however, does not provide a useful guide to the formulation and implementation of constructive tax changes.