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Normative Capital Cost Recovery for a Realization-based Income Tax

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I. INTRODUCTION

Tax policy makers and academics in the United States traditionally focus on tax systems based on income and consumption.[1] As a necessary adjunct to these fundamental tax base structural principles, these commentators have adopted complementary accounting principles in order to identify and compute the amounts of income and consumption to be taxed during a designated taxable period.[2] For example, most economists and tax policy commentators assert that an accretion-measured income tax comprehensively and accurately measures economic income.[3] Most commentators also accept the proposition that a tax based on income but measured only by cash flows (a cash flow income tax) is a practical surrogate for a theoretical consumption tax.[4] Following these traditions, this article assumes that an accretion-measured income tax (AMIT), and a cash-flow measured income tax (CFIT) are pure tax base paradigms in which the paired tax base structural and accounting principles theoretically complement each other.[5]

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1. Briefly, the former base taxes all net increases in wealth, including appreciation in value of accumulated wealth, while the latter base only taxes wealth when and as devoted to consumption. For the two works that defined income as a tax base, see Robert M. Haig, The Concept of Income—Economic and Legal Aspects, in The Federal Income Tax 1, 6-7, 27 (Robert M. Haig ed., 1921); Henry Simons, Personal Income Taxation 103 (1938). See also Richard B. Goode, The Individual Income Tax 59-99 (1986). For a seminal article on the practical design of a consumption tax base, see William Andrews, A Consumption-Type or Cash Flow Personal Income Tax, 87 Harv. L. Rev. 1113 (1974) [hereinafter Andrews, Cash Flow]. For a detailed discussion of the mechanics involved in implementing these two types of tax bases, see U.S. Dep't of the Treasury, Blueprints for Basic Tax Reform (1977) [hereinafter Blueprints]. See also Deborah Schenk, The Plethora of Consumption Tax Proposals: Putting the Value Added Tax, Flat Tax, Retail Sales Tax, and USA Tax into Perspective, 33 San Diego L. Rev. 1281 (1996).

2. This article consistently uses a calendar year as the taxable period regardless of the tax base under discussion. Cf. Jeff Strnad, Perodicity and Accretion Taxation: Norms and Implementation, 99 Yale L.J. 1817, 1820 (1990) (emphasizing the importance of defining the appropriate period to the structure of an income tax).

3. See Thomas L. Evans, The Taxation of Multi-Period Projects: An Analysis of Competing Models, 69 Tex. L. Rev. 1109, 1111 (1991). See also Brown & Bulow, The Definition of Taxable Business Income, in Comprehensive Income Taxation 241, 242-43 (J. Pechman ed., 1977).

4. This convention has been in almost universal use since publication of Andrews, Cash Flow, supra note 1, at 1113. For a proposal adopting this convention, see Blueprints, supra note 1, at 111, 113-15, 130.

5. For a description and critique of the assumptions underlying the "mapping" between traditional tax base accounting approaches and traditional structural concepts of income and consumption tax bases, see Jeff Strnad, Taxation of Income from Capital: A Theoretical Reappraisal, 37 Stan. L. Rev. 1023 (1985) (arguing that a cash flow income tax base accounting method implements the Haig-Simon income tax base

The U.S. income tax base, however, employs structural and accounting principles that differ from both the AMIT and CFIT base paradigms. Like an AMIT base, the U.S. income tax purports to tax "income" as opposed to "consumption;" but unlike an AMIT base, it does not as a general rule employ accretion accounting in order to measure "income."[6] Similarly, unlike a tax on consumption that is measured by cash flows, the U.S. income tax is not fundamentally structured to tax consumption; nor does it use cash flow accounting as the primary means of measuring the "income" that it taxes.[7]

With respect to capital income taxation in general, the U.S. income tax base may be characterized as a realization-based income tax (RBIT) because it uses the principle of realization to define and measure capital income. Overall, three major structural and accounting principles distinguish a RBIT from either the AMIT or CFIT capital income taxation paradigm. All of these principles have important capital income taxation policy implications. However, this article focuses on those principles in the context of short-lived completely wasting income-producing assets because their application is fairly clear in this context. In addition, an analysis of these assets allows this article to highlight and isolate the important issue of RBIT cost recovery policy.

First, under the realization principle *per se*, the "income" that a RBIT base taxes, does not include mere increases or decreases in wealth (i.e., the net

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structural ideal more correctly than traditional accretionary income tax base accounting with respect to the net present value of investment and borrowing transactions) [hereinafter Strnad, Reappraisal]. For criticism of Professor Strnad's methodology, analysis or conclusions, see Louis Kaplow & Alvin C. Warren, Jr., An Income Tax by Any Other Name–A Reply to Professor Strnad, 38 Stan. L. Rev. 399 (1986); William D. Popkin, Tax Ideals in the Real World: A Comment on Professor Strnad's Approach to Tax Fairness, 62 Ind. L.J. 63 (1986). For rebuttals of those criticisms, see Jeff Strnad, The Bankruptcy of Conventional Tax Timing Wisdom Is Deeper Than Semantics: A Rejoinder to Professors Kaplow and Warren, 39 Stan. L. Rev. 389 (1987); Jeff Strnad, Tax Timing and the Haig-Simons Ideal: A Rejoinder to Professor Popkin, 62 Ind. L.J. 73 (1986). See discussion at infra note 111 and accompanying text.

6. Congress has enacted limited exceptions to the non-accretion principle in recent years in the form of "mark-to-market" rules which require certain taxpayers to use unrealized gains and losses in computing taxable income. See IRC §§ 1256 (gains and losses on regulated futures, foreign currency, and other contracts are recognized annually in amounts determined as though contracts held on the last day of the taxable year were sold at their fair market value); 475 (similar rule applied to dealers in securities). See generally, Edward D. Kleinbard & Thomas L. Evans, The Role of Mark-to-Market Accounting in a Realization-Based Tax System, 97 Taxes 788 (1997); David A. Weisbach, A Partial Mark-to-Market Tax System, 53 Tax L. Rev. 95 (1999).

7. The U.S. income tax allows the use of both the cash and accrual methods of accounting as a general rule, as well as any other reasonable method of accounting that clearly reflects income. See IRC § 446 (2000). Congress only mandates the use of the cash accounting method in certain circumstances where the use of the accrual method could possibly facilitate the operation of tax shelters.

value of taxpayer assets).[8] Instead, such increases and decreases in value enter the tax base only when "realized" by conversion of those assets into money or other assets differing materially either in kind or extent from the asset converted.[9]

Second, because a RBIT (like an AMIT) taxes earnings even if they are invested, in theory earnings-financed investment should only be made with after-tax dollars or "capital" in the tax sense of the word.[10] This article calls this the capital formation principle.

The realization principle and the capital formation principle interact in the following manner. Because the purchase of an asset does not generally cause a realization of income, and because any subsequent changes in value cannot enter the tax base until the asset undergoes a realization event, assets must be assigned an amount at the time of their acquisition that quantifies the amount of tax "capital" invested in them. This amount measures and accounts for the invested capital in order to avoid taxing that capital again when the terminal value of the asset is subsequently realized and the amount of net realized income or loss is determined. The tax accounting convention that measures the investment of capital in a given asset is called basis, and only to the extent that an amount realized from the subsequent disposition of an asset exceeds its

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8. It has long been established that gain or loss in the value of property is taken into account for income tax purposes only if and when the gain or loss is "realized," that is, when it is tied to a realization event, such as the sale, exchange or other disposition of the property. Mere variation in value– the routine ups and down of the marketplace– do not in themselves have income tax consequences. This is fundamental in income tax law.

Cottage Savings Assn., 499 U.S. 554, 111 S. Ct 1519, 1520 (1991) (Blackmun, J., dissenting)., cf. supra note 6.

9. Regs. § 1.1001-1(a). The U.S. Supreme Court decided in 1991 that a swap of functionally identical mortgage pools between institutions met the standard under this regulation. See Cottage Sav. Ass'n v. Commissioner, 499 U.S. 554, 556 (1991). Because of intervening increases in interest rates, both parties deducted losses on the exchange. Five years later, the Treasury Department issued new Regulations classifying "debt modifications" as realization events only if those modifications were "significant." See Regs. § 1.1001-3.

10. The term capital is used here to describe the amounts available to RBIT base taxpayers after tax has been paid on all concurrent realized income. This is a critical issue in this article. In the real world, of course, all RBIT base investment, even earnings-financed investment, is not necessarily financed from capital. However, capital is a normative RBIT base structural principle, and, with realization, is one of the structural principles that most distinguishes a RBIT from an AMIT or CFIT base. Therefore, this article assumes that an analysis of normative cost recovery policy should begin in and with the economic context of capital-financed investment.

adjusted basis does the net amount enter a RBIT base.[11] Neither AMIT nor a CFIT base employs a counterpart to these unique structural and accounting features of a RBIT base.[12]

A third principle of RBIT base capital income taxation applies if an asset is physically or economically self-exhausting. Such an asset's complete decline in value or utility over time does not reduce the tax base directly, because unrealized changes in asset value are not included in a RBIT base. Instead, in order to measure and tax only net realized income, at some point in time the tax base must be reduced by means of one or more deductions in order to restore the amount of the capital invested in the asset to the taxpayer. Otherwise, capital would be taxed again as the asset converted itself completely into income and wasted away. This structural principle is called the capital recovery principle. Cost recovery is a particular RBIT base accounting technique by which the capital cost of such a self-exhausting asset is recovered tax-free from otherwise taxable income prior to any realization of the asset's terminal value at the time of its disposition. This treatment is particularly appropriate where the terminal realized value of the asset is likely to be little or nothing.[13]

U.S. tax policy with respect to cost recovery for short-lived completely wasting assets is at a watershed. On one hand, many policy makers assume or seem to conclude that economic depreciation properly measures income in the U.S. tax base.[14] In addition, there is a growing trend among commentators to see

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11. See IRC § 1001(a). Similarly, if the amount so realized is less than the previous capital investment, the difference may be deducted, which results in the tax-free recovery of the amount invested in either event. Id. See IRC § 1016(a) for a list of the items that require or allow an adjustment to be made to an asset's basis.

12. The closest analogy in either tax system is an AMIT base which taxes and accounts for the difference between an asset's initial and terminal values, but measures and taxes that difference periodically despite the intervening lack of realization. See discussion at infra Part III.C.1.

13. In the case of other assets, only the un-recovered amount of that cost remaining at realization should offset any amount realized at that time in order to quantify the gain or loss realized, and therefore the net effect on the taxpayer's tax base. See IRC §§ 1016(a)(2); 1001(a).

14. See Michael Graetz, Federal Income Taxation: Principles and Policies 347-51 (1985). See also Report to the Congress on Depreciation Recovery Periods and Methods (Treasury Department, July 28, 2000) [hereinafter Treasury Department Report]. The assumption that economic depreciation is the normative depreciation method for the U.S. income tax base runs throughout this study. See id. at 3 (replacing the current depreciation structure, "with a system more closely related to economic depreciation is sometimes advocated as the ideal reform"); id. at 27 (evaluation of the current cost recovery system "focuses on how closely current law cost recovery allowances reflect allowances based on economic depreciation; how deviations from economic depreciation affect the level and distribution of taxes on capital income; and justifications for any current law deviations from economic depreciation").

the realization principle as an aberration that should be corrected or compensated for in the area of capital income taxation.[15] Both of these positions suggest that the U.S. RBIT base should be made to more closely resemble an AMIT base. On the other hand, since the early 1980's Congressional cost recovery policy has clearly shifted toward expensing, which makes the U.S. tax base more closely resemble a consumption tax base.[16]

This article takes a middle ground and asks whether a RBIT base has intrinsic or normative structural and accounting principles that indicate a third direction for U.S. cost recovery policy to take. In the context of capital-financed, short-lived, and completely wasting assets this article answers that question in the affirmative.

This article assumes that normative capital cost recovery principles for a realization-based income tax base may be determined by extrapolating from a deep analysis of the capital formation, capital recovery and realization principles just described. This article does not treat these principles merely as practical deviations from a Haig-Simons income tax, but as the normative structural and accounting features of a unique and functionally discrete tax base. Rather than attempting to correct or adjust the U.S. RBIT in order to emulate or replicate the financial or economic characteristics of an AMIT, this article shows how a particular object of RBIT capital income taxation policy – capital cost recovery for short-lived completely wasting assets – can be structured using these normative principles.

This article adopts three major analytical assumptions. First, normative RBIT base structural and accounting principles can be best understood through a comparative analysis of those principles and their functional equivalents in AMIT and CFIT bases. Therefore, this article adopts a comparative approach to analyzing RBIT base capital income taxation policy in general and cost recovery policy in particular. Second, RBIT base cost recovery methods themselves should be analyzed in a comparative manner, and such an analysis must necessarily take place in a common economic context. Capital-financed investment was chosen for this context because capital formation is a central structural principle of a RBIT base and this context allows cost recovery methods to be comparatively analyzed independently of many other tax policy

15. For an excellent summary of these works and cites thereto, see Deborah H. Schenk, A Realization-Based Income Tax and the Taxation of Capital, 53 Nat'l Tax J. 109 (2000) and works cited therein.

16. See discussion infra Part II.E. The types of tangible short-lived real assets discussed in this article are generally subject to both the accelerated cost recovery system of IRC § 168 (Accelerated Cost Recovery System), but also to IRC § 179 (Election to Expense Certain Depreciable Business Assets) at the election of the taxpayer under certain conditions. The former system has been "expensing-equivalent" at certain times. Id.

issues.[17] Third, this article financially analyzes cost recovery methods because most cost recovery methods employed in the U.S. are multi-period phenomena, and only a comparative financial analysis can meaningfully distinguish the tax policy effects of these methods from each other.

Starting with the third assumption, Part II of this article first analyzes the financial effects produced by the three major RBIT base cost recovery methods – economic cost recovery, accelerated cost recovery, and expensing – on the transactional level. In the process, this Part introduces the investment model and some of the financial analytical criteria used to evaluate not only RBIT base cost recovery methods but also the taxation of this type of depreciable asset in all three of the tax bases considered.[18] Part III then analyzes and compares the structural and accounting principles employed in each of these tax bases, going into the most detail with respect to a realization-based income tax. This Part ends by defining the two criteria that are used to identify a normative RBIT base capital cost recovery method: recovering the full cost of capital investment financially, and appropriately measuring net *realized* income financially. For this purpose, "appropriately" means in a manner consistent with the fundamental RBIT base structural and accounting principles described above.

Before applying these criteria, however, Part IV takes a deep look at the dynamics of capital formation, capital investment and capital cost recovery in a RBIT base. This article defines the term "capital cost recovery" as the tax-free recovery of the cost of investment that is financed exclusively with capital, or previously taxed dollars.[19] Part IV develops a formula by which the maximum amount that can be invested in a RBIT base from capital under *any* cost recovery method can be expressed as a percentage of net current earnings and as a variable of the tax rate.[20] At or below this fairly high capital formation

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17. For example, this article restricts its analysis to capital-financed, short-lived, completely wasting assets. Analyzing longer-lived, incompletely-wasting or debt-financed assets would require consideration of a much broader range of issues. This article is designed to elucidate only the most fundamental principles of normative RBIT based cost recovery.

18. The term "depreciable assets" is used generically in this context. This article uses the term depreciation to refer to the tax base structural and accounting principle applied to "depreciable assets" in an AMIT base, and the term "cost recovery" to refer to the similar but also different principle applied to "depreciable assets" in a RBIT base.

19. Outside of this context, cost recovery methods per se cannot be compared in a consistent tax base structural context. See discussion at infra Part IV.A.

20. "Earnings" in this context refers to net taxable income from all sources other than the investment being analyzed, but is otherwise determined in the usual manner. Any first year cost recovery deductions that are allowed under a given cost recovery method are also treated in the usual manner, even if they offset "earnings" and further reduce taxable income. "Capital" is the amount of after-tax dollars remaining after tax is paid on net taxable income after all cost recovery deductions offsets are allowed.

threshold,[21] *all earnings-financed investment is capital investment* regardless of the cost recovery method employed, and *all cost recovery* is therefore *capital cost recovery*.[22] Capital cost recovery precludes consumption tax treatment within a RBIT base, even if expensing is used as a cost recovery method, and allows RBIT base cost recovery methods to be analyzed consistently and exclusively in relation to all three of the normative RBIT base structural and accounting principles described above – capital formation, cost recovery, and realization.

Part V then shows that capital expensing is the only capital cost recovery method that fully restores invested capital financially and thus meets the first criterion for a normative RBIT capital cost recovery method. Because other cost recovery methods restore capital through deductions over time but only restore the nominal amount invested, they cannot fully compensate taxpayers for the use of their capital in present value terms. As E. Cary Brown pointed out over fifty years ago,[23] only expensing among RBIT base cost recovery methods provides investors with an after-tax return on after-tax investment equal to the original amount invested. Thus, the after-tax present value of a taxpayer's invested capital is not impaired by the time value of money and is fully restored financially.

Part VI then examines the second criterion for a normative capital cost recovery method – the appropriate financial measurement of capital income. This Part shows that economic depreciation appropriately and accurately aids an AMIT base in financially measuring net unrealized income. Similarly, this Part shows that unlimited expensing appropriately and accurately measures the taxable economic output of short-lived productive assets in a CFIT base financially. Both of these analyses utilize the financial criteria of net present value, internal rate of return and financial hurdle rates. These same financial criteria show that a RBIT base measures realized income accurately across a wide range of financial circumstances only when capital expensing is employed as a capital cost recovery method.

Based on the foregoing analysis, Part VII concludes the article with the following summary arguments. An accretion-measured income tax includes any net increases in the value of depreciable assets in the tax base when and as those increases accrue. During the holding period of a depreciable asset, net accretions to wealth occur to the extent that the economic yield or output

21. See discussion, infra note 134 and accompanying text.

22. This analytical framework is very different from that used in many other works which assume that all investment is funded from pre-tax earnings, and which therefore reach very different conclusions. E.g., Calvin H. Johnson, Soft Money Investing Under the Income Tax, 1989 U. Ill. L. Rev. 1019 [hereinafter Johnson, Soft Money].

23. E. Cary Brown, Business-Income Taxation and Investment Incentives, in Income, Employment and Public Policy: Essays in Honor of Alvin H. Hansen 300 (1948).

produced by the asset exceeds the asset's unrealized decline in value. Economic depreciation is designed to measure those unrealized declines in value as an aid to determining net unrealized (or "economic") income.

The taxation of depreciable assets in a RBIT base, however, is structurally independent of a depreciable asset's value prior to realization. As just noted, economic depreciation is designed specifically to measure accrued and *unrealized* changes in the value of depreciable assets within an AMIT base. As such, it is structurally inappropriate for a RBIT base because it would combine accounting for realized income (the asset's yield) with an accounting for unrealized decreases in the asset's value in an improper attempt to measure net *realized* income.

On the other hand, despite its mechanical similarities, RBIT base capital expensing is not identical to CFIT base cash flow accounting because a *capital* expensing deduction only recovers after-tax capital tax-free rather than pre-tax income. Capital expensing as a cost recovery method *is* appropriate for a RBIT base because it functionally separates the accounting for capital restoration from the accounting for *realized* investment yield. As a result it allows the full amount of invested capital to be restored tax-free *and* the full amount of the realized yield to be taxed as income financially. Therefore, the article concludes, capital expensing is the only normative capital cost recovery method for a realization-based income tax.

II. The Financial Characteristics of Various Cost Recovery Methods Under the U.S. Income Tax

The timing, rather than the amount, of deductions distinguishes one RBIT base cost recovery method from another. This Part introduces an investment model that allows RBIT base cost recovery methods to be analyzed on the basis of the relative financial value they provide to taxpayers after tax, and the relative percentages of an asset's financial value received by taxpayers and government after tax. This Part also introduces the financial benchmarks that allow the financial characteristics of various cost recovery methods to be compared to each other. Those same benchmarks and others will be used in later Parts of this article to compare the treatment of short-lived completely wasting assets in the three tax bases.

A. *Economic Cost Recovery*

Economic depreciation is an integral and normative feature of a tax based on economic income and measured by accretion (an AMIT base).[24] The term "economic depreciation" has also become synonymous with a RBIT base cost recovery method ("economic cost recovery") that produces the same financial consequences as economic depreciation but within a RBIT base. Economist Paul Samuelsen characterized economic depreciation as a depreciation method that reduced the investor's annual rate of return by the nominal tax rate and thereby ensured that depreciation deductions represented "putative decline in economic value."[25] Subsequently, and as a practical matter, many tax commentators adopted a financial convention for portraying and analyzing this type of economic depreciation that was popularized by Professor Marvin Chirelstein.[26] This convention defined economic depreciation as the annual decrease in the present value of the future income stream to be produced by an asset each year during the useful life of that asset.[27] Thus, the "Chirelstein convention" portrayal of "Samuelson economic depreciation" is a simplified but

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24. E.g., Strnad, Reappraisal, supra note 5, at 1027-28. See also discussion at infra Part III.A.

25. See Paul A. Samuelson, Tax Deductibility of Economic Depreciation to Insure Invariant Valuations, 72 J. Pol. Econ. 604 (1964). See also discussion, infra note 37 and accompanying text.

26. See Marvin A. Chirelstein, Federal Income Taxation 145-49 (7th ed. 1994).

27. The financial conditions are as follows: The decrease in value of the asset during each year is measured by comparing the discounted present value of the remaining income stream at the beginning and end of each taxable year using the pre-tax yield rate as the discount rate. For example, assuming a 10% yield rate as the discounting rate and compounding annually, the values of the income stream produced by the asset portrayed in Table 1 at the time placed in service (Day 1 of Year 1) and on the first day of each subsequent time period, and the decrease in value during each taxable year are as follows:

Begin:	Tot remain income:	PV remain income:	PV decrease during Year:	Econ deprec. deduction:
Year 1	126.20	100.00	(100.00 - 78.44)	21.56
Year 2	94.65	78.44	(78.44 - 54.74)	23.70
Year 3	63.10	54.74	(54.74 - 28.68)	26.06
Year 4	31.55	28.68	(28.68 - 0.00)	28.68

The sequence of depreciation deductions represented by the last column, "Decrease during Year," represents a crude, but accepted, baseline for comparison of depreciation methods which at least some commentators have termed "economic depreciation." Id. at 149. See John P. Steines, Income Tax Allowances for Cost Recovery, 40 Tax L. Rev. 483, 491 (1985) [hereinafter Steines, Cost Recovery]; Martin J. McMahon Jr., Reforming Cost Recovery Allowances for Debt Financed Depreciable Property, 29 St. Louis U. L.J. 1029, 1039 n.50, 1059 (1985) [hereinafter McMahon, Reforming].

widely-used technique for quantitatively representing economic depreciation in an AMIT base (and economic cost recovery in a RBIT base) under financial equilibrium conditions, and is used for that purpose herein.[28]

An example of a $100 investment using the Chirelstein economic depreciation convention is portrayed in Table 1 below.[29] Since it is the first of many Tables of this kind in this article, a detailed explanation follows it.

Table 1: $100 Investment Subject to Economic Depreciation

Year	G.I.	Rcvry	T.I.	PTCF	Tax	ATCF
1	31.55	21.55	10.00	31.55	5.00	26.55
2	31.55	23.70	7.85	31.55	3.92	27.62
3	31.55	26.07	5.48	31.55	2.74	28.81
4	31.55	28.68	2.87	31.55	1.43	30.11
TOT	126.20	100.00	26.20	126.20	13.10	113.10
PV_1	100.00	78.35	21.65	**100.00**	10.82	89.18
PV_2	111.86	**88.14**	23.73	111.86	11.86	**100.00**
IRR				**10.00%**		**5.00%**

Table 1, like most of the Tables in the text, shows both a cash flow accounting and a tax accounting. This facilitates both an economic and a financial analysis of cost recovery methods and capital income taxation regimes. The cash flow accounting in Table 1 is represented by the formula: Pre-tax cash flow (PTCF) minus Tax equals After-tax cash flow (ATCF). These amounts are shown in the PTCF, Tax, and ATCF columns on both an annual and a cumulative basis.[30] The tax accounting is represented by the formula: Gross Income (G.I.) minus Recovery (Rcvry) equals Taxable Income (T.I.), again on both an annual and cumulative basis. Using a 50% tax rate for simplicity, the Tax column equals 50% of the Taxable Income column. The nominal total of each column for Years 1 through 4 is shown in the horizontal Total (TOT) row. The items described to this point determine the nominal or economic consequences of the transaction portrayed in Table 1 and all of the Tables used in this article.

For the purpose of determining a transaction's financial consequences, this article assumes, unless stated otherwise, that all investment and items

28. See sources cited supra note 27. See also Charles T. Terry, Leverage-Financed Tax Arbitrage: A Structural and Accounting Analysis, 7 Am. J. Tax Pol'y 109 (1988).

29. The transactional Tables used in this article owe their underlying structure and organization to those utilized by Professor Martin J. McMahon, Jr. in McMahon, Reforming, supra note 27.

30. Annual accounting is shown in the horizontal rows corresponding to Years 1 through 4. Cumulative accounting is shown in the vertical columns.

directly related to investment occur on the first day of Year 1 (or Time 0) and that all items of income and deduction take place simultaneously on the last day of each taxable year. This assumption consistently determines the present value of all tax-significant items in all tax base analyses as of Time 0 (or first day of Year 1). For the same reason, throughout this article all other items relating to the determination of the financial and economic consequences of the transactions described are presumed to occur simultaneously on the last day of taxable years 1 through 4.[31] These timing conventions provide accounting consistency within and among the three tax bases.[32]

Four items portray the financial consequences of economic cost recovery in Table 1. First, the PV_1 row shows the pre-tax present value of each column, using a 10% discount rate, compounded annually.[33] Since the tax rate is assumed to be 50%, the PV_2 row shows the after-tax present value of each column using a 5% discount rate compounded annually.[34] The IRR row shows

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31. In Table 1 all of the tax and financial events other than the Time 0 investment (which is not shown) occur on the last day of taxable years 1 through 4. This includes receipts, payments, and non-cash items such as recovery deductions. When Time 0 events are later introduced into the analysis, all Time 0 events will be shown as such in an additional Row labeled "0" for Time 0. E.g., infra Table 5.

32. A last day convention for all income tax base events facilitates portraying an accretion or cash flow-measured tax base that is sensitive to the time value of money. Within a cash flow-measured tax base such as a CFIT, Time 0 is the appropriate time to measure all initial cash flows, including investment. A first day (Time 0) convention for expensed recovery within an HIT base also seems appropriate for this cash flow-equivalent tax treatment of investment expenditures. Therefore, this article uses a last day convention when accounting for all true income tax events and for all events within any tax base that are determinative of financial consequences before or after tax. However, the article uses a first day of Year 1 (or Time 0) convention to account for both true expensing within a CFIT base and expensing as a generic income tax recovery method within either an AMIT or HIT base.

33. Since the yield rate produced by the investment equals the pre-tax discount rate of 10%, both the G.I. and PTCF columns have PV_1's of $100. This indicates that the pre-tax present value of both the tax and economic income streams produced by the asset equal the amount invested. In classical financial texts, the pre-tax discount rate is usually less than the real or projected yield rate, allowing the financial analyst to evaluate investments or potential profitability on the basis of their positive Net Present Value. E.g., Richard Brealey & Stewart Myers, Principles of Corporate Finance 10-12 (1981). For simplification purposes and because this article focuses on the relative financial differences among recovery methods, the pre-tax yield rate is assumed to equal the pre-tax discount rate (10%) throughout this article unless stated otherwise. This is the most common scenario employed in the literature and is called a break-even transaction in this article.

34. This discount rate measures how much a given series of tax or accounting flows is worth or costs on the assumption that each year's amount either makes or costs the taxpayer money (whether directly or indirectly), and that each year's amount earns a 10% pre-tax yield which is taxed at a 50% rate, leaving the net yield or cost of that

the Internal Rate of Return implicit in the Pre-tax and After-tax Cash Flow columns, respectively.[35] The fourth item is the IRR effective tax rate.[36] Table 1 illustrates Samuelsen economic depreciation because the IRR of the ATCF (5%) is exactly 50% of the IRR of the PTCF (10%) which demonstrates that the IRR effective tax rate or IRR ETR is exactly 50%. Samuelsen economic depreciation only exists when the IRR ETR matches the nominal tax rate.[37]

B. *Accelerated Cost Recovery*

Modern statutory cost recovery schedules seldom reflect the true ongoing diminution in economic value of the assets whose cost is being recovered. Instead they tend to allow cost recovery much "faster" than the economic exhaustion of those assets actually occurs.[38] Thus, like the capital recovery allowances available to taxpayers in many other countries, the present value of the series of recovery deductions available to U.S. income taxpayers with respect to many assets exceeds the present value of economic depreciation as defined earlier.[39] The financial value produced by such accelerated cost

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series of amounts after tax to be measured at a 5% discount rate compounded annually.

35. This financial characteristic measures the constant discount rate that, applied to the sequence of cash flows in Years 0 through 4, yields the amount of any equity invested at Time or Year 0 of the transaction. See Brealey & Myers, supra note 33, at 70-72. For example, in Table 3, since the asset yield rate is 10%, the IRR of the PTCF is also 10%.

36. The IRR effective tax rate is determined by dividing the IRR of the Pre-tax Cash Flow minus the IRR of the After-tax Cash Flow by the IRR of the Pre-tax Cash Flow. The formula can be expressed as: (IRR PTCF - IRR ATCF)/IRR PTCF = ETR.

37. This ratio satisfies the Samuelson definition of economic depreciation. Samuelson, supra note 25. Note that the timing conventions explained earlier play a critical role in defining economic depreciation. If, for example, annual tax and cash flow events were treated as occurring on the first, rather than the last day of each taxable year, the IRR of the ATCF would become 8.54%, and the IRR ETR would become (10.0 - 8.54)/10.0 = 14.6%. Under those circumstances, Table 3 would no longer demonstrate economic depreciation.

38. See Treasury Department Report, supra note 14, at 27, 32. The statement in the text is particularly true for short-lived assets but is dependent upon asset types and inflation rates.

39. E.g., Kopits, Tax Provisions to Boost Capital Formation Vary Widely in Industrial Nations, 11 Tax Notes 955 (February 17, 1980). This study was done before the combination of ACRS and the investment tax credit (ITC) was enacted. That combination was designed to approximately equal expensing (in after-tax present value terms). See infra note 70 and following text. See also Kopits, Industrial Countries Increase Their Use of Tax Incentives to Stimulate Investment, 12 Tax Notes 1083 (1981); See generally, Office of Federal Tax Services, Arthur Andersen & Co., Comparison of Present Value of Cost Recovery Allowances Permitted in Various Countries, 27 Tax Notes 1507 (June 24, 1985).

recovery methods after tax can be considerably greater than that produced by economic cost recovery. For example, Table 2 below portrays a $100 investment in a depreciable asset with a 10% yield over 4 years that is identical to the investment portrayed in Table 1 other than the fact that the ACRS recovery method, rather than economic depreciation, is used for tax accounting purposes.[40]

Table 2: $100 Investment Subject To ACRS Recovery

Year	G.I.	Rcvry	T.I.	PTCF	Tax	ATCF
1	31.55	25.00	6.55	31.55	3.27	28.27
2	31.55	38.00	-6.45	31.55	-3.23	34.77
3	31.55	37.00	-5.45	31.55	-2.73	34.27
4	31.55	0.00	31.55	31.55	15.77	15.77
TOT	126.20	100.00	26.20	126.20	13.10	113.10
PV_1	100.00	81.93	18.07	**100.00**	9.03	90.97
PV_2	111.87	**90.24**	21.64	111.87	10.80	**101.04**
IRR				10.00%		5.48%

Because the after-tax present value (PV_2) of the recovery deduction stream ($90.24) exceeds the comparable present value of the economic cost recovery deduction stream in Table 1 ($88.14) by $2.10, the PV_2 of the taxable income is reduced by approximately the same amount.[41] Conversely, because the taxable income in Table 2 has a $2.09 *lower* PV_2 than the T.I. in Table 1, the after-tax cash flow has a $1.04 *higher* PV_2. This relationship is appropriate since the tax rate is 50%. More importantly, the PV_2 of the ATCF in Table 2 ($101.04) exceeds the PV_1 of the PTCF ($100.00) by $1.04. This shows that a break-even investment in an asset subject to ACRS recovery is more valuable financially after tax than it is before tax, whereas an economically depreciated asset break-even investment is worth the same amount financially before and after tax.[42]

To further illustrate this point Table 3 below shows a $100 investment in an asset producing a 10% yield over four years which is subject to the

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40. The recovery deduction stream is based on that prescribed for 3-year recovery property by IRC § 168(b) (1981).

41. The PV_2 of the Taxable Income decreases from $23.73 in Table 1 to $21.64 in Table 2, a difference of $2.09.

42. The investment in Table 1, which is economically depreciated, is worth $100 financially both before tax (as measured by the $100 PV_1 of the PTCF) and after tax (as measured by the $100 PV_2 of the ATCF). This is appropriate not because the after-tax discount rate is exactly 50% of the pre-tax discount rate (which it also is in Table 2), but because only the economic cost recovery method in Table 1 produces an effective (or financial) tax rate that exactly equals the nominal tax rate.

Modified Accelerated Cost Recovery System (MACRS) an even more accelerated cost recovery method than ACRS under these circumstances.[43]

Table 3: $100 Investment Subject To MACRS Recovery

Year	G.I.	Rcvry	T.I.	PTCF	Tax	ATCF
1	31.55	33.33	-1.78	31.55	-.89	32.44
2	31.55	44.45	-12.90	31.55	-6.45	38.00
3	31.55	14.81	16.74	31.55	8.37	23.18
4	31.55	7.41	24.14	31.55	12.07	19.48
TOT	126.20	100.00	26.20	126.20	13.10	113.10
PV_1	100.00	83.22	16.78	**100.00**	8.39	91.61
PV_2	111.87	**90.95**	20.91	111.87	10.46	**101.41**
IRR				**10.00%**		**5.67%**

Now, the PV_2 of the recovery deduction stream ($90.95) exceeds that of economic depreciation ($88.14) by $2.81. Again, the higher after-tax present value of the recovery deduction stream leads to a lower present value of the taxable income stream,[44] and ultimately a higher after-tax present value (PV_2) for the after-tax cash flow ($101.41). Again the PV_2 of the ATCF exceeds the pre-tax present value (PV_1) of the pre-tax cash flow ($100.00), but now by $1.41 instead of $1.04.

Taken together, Table 1, Table 2 and Table 3 show that the "faster" a recovery method is, the more it increases the net after-tax present value of the After-tax Cash Flow produced by a given amount of investment.[45] Thus, for example, the *net* PV_2s of the ATCFs in Table 1 (Economic Depreciation), Table 2 (ACRS) and Table 3 (MACRS) are $0.00, $1.04 and $1.41, respectively. The higher the present value of an income tax recovery method, the higher the net present value of an investment in that asset is relative to alternative investments,

43. The recovery deduction stream in Table 3 is based on the MACRS system as enacted in the Tax Reform Act of 1986, Pub. L. 99-514, § 201(a), 100 Stat. 2085, 2122 (codified in IRC § 168(b).

44. $20.91 compared to $23.73 for a reduction of $2.82. See supra text, Part II.A., at 484 (Table 1).

45. Typically, alternative investment decisions are evaluated by comparing the net present values of the after tax return from alternative investments. The net present value in each case represents the excess of the present value of the return from a proposed investment over the present value of a minimum risk non-investment savings alternative, such as government bonds or certificates of deposit or other instruments of similar duration to the proposed investment. E.g., Brealey & Myers, supra note 33, at 12.

and the greater the financial attractiveness of investing in that asset.[46] Note, however, that these increments in financial value are solely a function of the recovery methods employed. Under all of these recovery methods, all of the nominal or economic results are identical,[47] and the pre-tax present value of the investment always equals $100.00.[48]

Table 2 and Table 3 also illustrate two other indicia of the financial value of accelerated recovery methods. Under economic depreciation, as portrayed in Table 1, for example, the IRR of the After-tax Cash Flow (5%) was exactly 50% of the IRR of the Pre-tax Cash Flow (10%). This relationship demonstrated that the IRR effective tax rate matched the nominal tax rate of 50%.[49] ACRS depreciation increased the IRR of the ATCF to 5.48%, and MACRS increased it even more to 5.67%, thus reducing the IRR effective tax rates to 45.2% and 43.3%, respectively.[50]

C. *Year-end Expensing*

In the "real world," an expensed asset may be purchased at any point in time between the first day of Year 1, which is when investment in assets is generally deemed to occur for purposes of this article, and the last day of Year 1, which is when Gross Income, Recovery Deductions and all other financial and tax events are accounted for under the conventions used in this article and under the tax accounting rules prescribed in the Internal Revenue Code.[51] Thus, it can be argued that expensing deductions take effect at the same time (the end of Year 1) as deductions under the cost recovery methods already discussed.[52]

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46. The net present values of the After-tax Cash Flows are computed by subtracting from the PV_2 of the ATCF in each case the initial $100 cost of each investment.

47. Thus, in Table 1 through Table 5, Total G.I. = $126.20, Total Recovery = $100.00, Total T.I. = $26.20, Total Tax = $13.10 and Total ATCF = $113.10.

48. This result shows that because only the cost recovery methods differ from one investment to another, and because the PV_2 of the ATCF under economic depreciation is $100, accelerated recovery methods are the only reason for the positive financial value of the investment after tax as measured by the PV_2 of the ATCF in Table 2 and Table 3.

49. See supra note 36 and accompanying text.

50. Applying the ETR formula from supra note 36 to Table 2 produces an IRR ETR of 45.2%. In the MACRS case, the application produces an IRR ETR of 43.3%.

51. See discussion, supra notes 31-32 and accompanying text.

52. This simplifying assumption ignores the impact of interim income and deductions on the amount of quarterly estimated tax payments for which many taxpayers are responsible. E.g., IRC §§ 6654 (individuals), 6655 (corporations). It also ignores the fact that the tax liability for a taxable year is not payable in full until well after the close of the taxable year. See IRC §§ 6072 (due dates for calendar year corporate and non-corporate income tax returns are March 15 and April 15 of the following calendar year, respectively), 6151 (tax payment is due with returns on date required for filing of returns).

Table 4 below illustrates the expensing of an asset purchased on Day 1 of Year 1 using a "last day" convention. This approach to expensing is consistent with the structural and timing assumptions that were used with the other income tax recovery methods just described.

Table 4: Asset Purchase On First Day & Expensing On Last Day Of Year 1

Year	G.I.	Rcvry Ded	T.I.	PTCF	Tax	ATCF
1	31.55	100.00	-68.45	31.55	-34.23	65.78
2	31.55	0.00	31.55	31.55	15.78	15.78
3	31.55	0.00	31.55	31.55	15.78	15.78
4	31.55	0.00	31.55	31.55	15.78	15.78
TOT	126.20	100.00	26.20	126.20	13.10	113.10
PV_1	100.00	90.91	9.10	**100.00**	4.56	95.48
PV_2	111.87	**95.24**	16.64	111.87	8.33	**103.57**
IRR				**10.00%**		7.11%

The expensing cost recovery method in Table 4 expensing differs from the accelerated cost recovery methods already discussed only in that much more of the recovery deduction "stream" offsets income other than that produced by the investment itself because all cost recovery occurs in Year 1.[53] However, the expensing demonstrated in Table 4 is substantially "faster" financially than any other form of cost recovery analyzed so far when applied to identical amounts of investment.[54] For example, the after-tax present value of "last day" expensing ($95.24) exceeds that of economic depreciation ($88.14) by $7.10 under identical economic and financial circumstances. Its present value also exceeds those of ACRS and MACRS, although by lesser amounts.[55] Second, the expensing in Table 4 produces an After-tax Cash Flow with an after-tax net present value of $3.57, which is much greater than that produced by the other cost recovery methods.[56] Third, the Internal Rate of Return (IRR) of the After-

53. In Year 1, the $100 expensing deduction offsets the $31.55 of Gross Income produced by the asset, and the negative $68.45 of asset taxable income is presumed to offset an equal amount of non-asset Gross Income. This deduction produces tax savings of $34.23 (50% of $68.45). The ATCF of $65.78 consists of the sum of the $31.55 PTCF produced by the asset and those tax savings.

54. At the same time, the expensing in Table 4 is substantially "slower" financially than theoretical instantaneous expensing.

55. Cf. the PV_2 of the Recovery deduction columns in Table 2 (ACRS), which is $90.24, and Table 3 (MACRS), which is $90.95, a difference of $5.00 and $4.29, respectively.

56. Cf. the ATCF PV_2 figures from Table 1 (Economic Depreciation), $100.00, Table 2 (ACRS), $101.04, and Table 3 (MACRS), $101.41. Since all these investments have a 10% pre-tax yield rate and use a 10% pre-tax discount rate, none of them have any net present value before tax. All of the PTCF PV_1s equal zero. As pre-tax investment is subjected to faster and faster recovery methods, its after-tax *net* present

tax Cash Flow increases to 7.11% and therefore reduces the IRR effective tax rate to only 28.9%. The expensing in Table 4 is clearly the "fastest" of any cost recovery method yet considered under the circumstances used in comparing all cost recovery methods so far.[57] Note, however, that the nominal amounts of Taxable Income ($26.20), Tax Paid ($13.10) and After-tax Cash Flow ($113.10) in Table 4 are identical to those in Table 1 (Economic Depreciation), Table 2 (ACRS) and Table 3 (MACRS), respectively. Under the assumptions employed so far, expensing *as a cost recovery method* clearly affects only the financial effects of a given asset investment rather than the economic effects.

D. *Theoretical Instantaneous Expensing*

In theory and purely from a tax base accounting standpoint, expensing can be viewed as a recovery method that differs only in timing from other cost recovery methods. For example, according to Professor Warren, "Expensing and economic depreciation can be regarded as points along a continuum, with depreciation systems that are accelerated relative to economic depreciation fallin between these two points."[58] As Warren further notes, "[e]xpensing can thus be characterized as extremely accelerated, or . . .'*instantaneous' depreciation*."[59] This section of the article constructs a model of theoretical instantaneous expensing.

Given the timing assumptions used in this article's analytical model, instantaneously expensing the cost of an asset financially requires deducting that cost at the exact moment of the asset's acquisition. In constructing a basic model of theoretical instantaneous expensing as a RBIT base cost recovery method, this article assumes that expensing takes effect precisely at the time of

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value (Cost - ATCF PV_2's) increases. See supra notes 45-48 and accompanying text.

57. This conclusion is dependent upon the timing assumptions used in this article. For example, if one assumes that both the $100 investment in the asset and recovery are made on the last day of Year 1, the IRR of the PTCF and ATCF each become 18.14% instead of 10%. On the other hand, if one treats all recovery deductions as occurring on the first day of each taxable year, one expenses the first year recovery deduction under all recovery methods, as well as the real world expensing deduction portrayed in Table 4. This is apparently the method employed in Alan J. Auerbach, The New Economics of Accelerated Depreciation, 23 B.C. L. Rev. 1327, 1346-47 (1982) [hereinafter Auerbach, Auerbach Convention] (treating all recovery deductions as being effective on the first day of each taxable year). See infra note 60. Under neither alternative are the results even close to those in Table 4.

58. See Alvin C. Warren, Jr., Accelerated Capital Recovery, Debt, and Tax Arbitrage, 38 Tax Law 549, 555 (1985) [hereinafter Warren, Arbitrage].

59. Id. at 555 (emphasis added).

investment, which is called Time 0.[60] An argument can be made that this convention has a real-world counterpart since placing an expensed asset in service causes an immediate anticipated reduction in the investor's estimated tax liability that can be valued in present value terms from that point in time.[61]

In order to compare the financial effects of theoretical instantaneous expensing to those of other income tax recovery methods, this article continues to assume that the amount invested is $100.[62] Thus, the expensing deduction has a present value measured at Time 0 of $100.[63] This article also continues to assume that all other items of income and deduction take place on the last day of the taxable year. This allows us to continue determining the present value of all tax and financial events as of Time 0 (or beginning of Year 1).[64] This scenario is not designed to replicate real world conditions,[65] but to provide a consistent framework for theoretical comparative analysis.[66]

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60. Alternative conventions could be applied. E.g., Auerbach, Auerbach Convention, supra note 57, at 1346-47 (treating investment and all recovery deductions as being effective on the first day of each taxable year).

61. Compare supra note 52, where the impact of expensing on estimated tax liability was ignored for purposes of analyzing "year end" expensing.

62. By necessity, the analysis temporarily begs, for the moment, the question of how much economic investment can be made under an expensing regime within a HIT base. This subject is discussed in infra Part IV.B., when the question is considered in the context of earnings-financed investment.

63. E.g., Steines, Cost Recovery, supra note 27, at 508 n.54.

64. All tax and financial events (other than Time 0 investment and the expensing deduction) in the cycle: earnings - tax = investment x yield rate = yield - tax = ATCF occur on the last day of taxable years 1 through 4. This includes receipts, payments, and non-cash items such as recovery deductions. See supra notes 31-32 and accompanying text.

65. The real world situation most closely approximating these theoretical conditions would be the purchase and expensing of an asset on the very last day of one taxable year followed by four subsequent calendar years of income production. In that event, the expensing deduction would be accounted for in the first year, while the asset would produce a four-year income stream similar to that used in these Tables. See Table 5. However, it is unlikely that even this situation would exactly replicate the financial characteristics of theoretical instantaneous expensing because tax liabilities, and therefore savings, do not become fixed legally until some time after investment in an asset occurs, even if that investment occurs on the last day of a taxable year. See supra note 52 and accompanying text.

66. As noted earlier, this article uses a last day convention when accounting for all generic income tax base events and a first day of Year 1 (or last day of Year 0) or simply "Time 0" convention to account for both true expensing and expensing as a nominal income tax base recovery method. See supra notes 31-32 and accompanying text. A last day convention for all income tax base events is also consistent with the timing of filing determinations and requirements and facilitates an analysis which is sensitive to the time value of money, whereas a Time 0 deduction seems appropriate for this essentially consumption tax treatment of investment. Another important argument

Applying the foregoing timing assumptions, Table 5 below presents a $100 investment that is subject to theoretical instantaneous expensing.

Table 5: $100 Investment Subject To Theoretical Instantaneous Expensing

Year	G.I.	Rcvry	T.I.	PTCF	Tax	ATCF
0	0.00	100.00	-100.00	-100.00	-50.00	-50.00
1	31.55	0.00	31.55	31.55	15.78	15.78
2	31.55	0.00	31.55	31.55	15.78	15.78
3	31.55	0.00	31.55	31.55	15.78	15.78
4	31.55	0.00	31.55	31.55	15.78	15.78
TOT	126.20	100.00	26.20	26.20	13.10	13.10
NPV_1	100.00	100.00	0.00	**0.00**	0.00	0.00
NPV_2	111.87	**100.00**	11.86	11.86	5.93	**5.93**
IRR				**10.00%**		10.00%

The economic consequences shown for "Year 0" reflect the expensing deduction of $100 at Time 0. This deduction reduces taxable income by $100, which in turn reduces tax by (or creates tax savings of) $50, leaving a positive after-tax cash flow of $50. During Years 1 through 4, the asset produces the same Gross Income and pre-tax cash flow streams as in Tables 1 through 4, but Gross Income in those years is not reduced by any cost recovery deductions, so annual T.I. equals both G.I. and PTCF ($31.55), and ATCF is exactly 50% of that amount ($15.775).

Financially, the after-tax present value (PV_2) of the "recovery deduction stream" in Table 5 at Time 0 ($100.00) now equals the amount invested. That PV_2 also exceeds the comparable present value of the economic depreciation deduction stream in Table 1 ($88.14) by $11.86. The NPV_2 of the ATCF ($5.93) now exceeds the NPV_1 of the pre-tax cash flow ($0.00) by half of that amount, or $5.93.[67] Table 5 also shows that the internal rates of return on the investment are the same both before and after tax (10%) and that the investment is therefore subject to a 0% IRR effective tax rate.[68]

for an exception in the form of a first day convention for expensed recovery deductions is that such timing is necessary in order to create the financial and economic consequences attributed to theoretical expensing in the traditional literature.

67. Table 5 shows net present values, while Tables 1 through 4 used present values. Infra Part II.F., conducts a closer examination of net present value and compares all of the cost recovery methods examined so far using that criterion. That examination will not change the results of or conclusions drawn from Tables 1 through 5 at this point.

68. For a definition of IRR effective tax rate, see supra note 36.

E. *Expensing-equivalent Cost Recovery*

Congress made a more or less conscious decision in 1981 to implement a statutory approximation of expensing as a capital income tax recovery policy for the kinds of depreciable assets discussed in this article.[69] The original combination of ACRS and the Investment Tax Credit (ITC) was designed to produce an overall cost recovery allowance with an after-tax present value equal to the amount invested for most classes of personal property under then prevailing conditions, and is usually referred to as expensing-equivalent by commentators.[70] Because the conservative discount rate assumptions implicit in the original scheme made it more generous than expensing as interest rates subsequently rose, as part of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), Congress adjusted the statutory scheme in order to reduce the interest rate at which expensing-equivalence would exist.[71]

Although cost recovery schedules that meet Congress's financial criterion are characterized as "expensing equivalent" or even beyond,[72] these schedules can produce results that differ from those produced by theoretical simultaneous expensing. For example, Table 6 below represents an investment subject to ACRS and ITC cost recovery under the Economic Recovery Tax Act of 1981 as originally enacted.[73] This combination of recovery allowances has been described as expensing equivalent because the after-tax present value of tax-free recovery under this method equals or exceeds the amount of the nominal investment.[74] Table 6 converts the 6% ITC, for which 3-year recovery property was eligible after ERTA, into an equivalent deduction of $12 in Year 1 based on the 50% tax rate used in our investment model. Thus, the recovery deduction for Year 1 in Table 6 is $37, which is the sum of a first year ACRS

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69. See S. Rep. No. 97-494, at 122, reprinted in 1982 U.S.C.C.A.N. 781, 886-89; Staff Of The Joint Comm. On Taxation, 97th Cong., Analysis Of Proposals For Depreciation And Investment Tax Credit Revisions, Part I: Overview 12 (Comm. Print 1981).

70. See Alan J. Auerbach & David Raboy, 10-5-3 versus First Year Recovery: A Depreciation Debate, 12 Tax Notes 899, 906 (1981); Auerbach, Auerbach Convention, supra note 57, at 1346; Calvin H. Johnson, Tax Shelter Gain: The Mismatch of Debt and Supply Side Depreciation, 61 Tex. L. Rev. 1013, 1022-25 (1983) [hereinafter Johnson, Mismatch].

71. Pub. L. No. 97-248, § 206 (1982). See Senate Comm. on Finance, Report on Tax Equity and Fiscal Responsibility Act of 1982, S. Rep. No. 494, 97th Cong., 2d Sess. 122, 122-23; Johnson, Mismatch, supra note 70, at 1022-23.

72. I.e., with an after-tax present value of recovery that equals or exceeds that of total nominal investment in the asset.

73. Pub. L. No. 97-34, § 201(a), 95 Stat. 172, 203-19 (1981).

74. See Steines, Cost Recovery, supra note 27, at 537-38; see also Auerbach, Auerbach Convention, supra note 57, at 1346-47. In Table 6, for example, the PV_2 of recovery, $101.67, exceeds the amount of the investment, $100.00.

recovery deduction of $25 and an ITC-equivalent deduction of $12. That deduction is computed as occurring on the last day of Year 1.[75]

Table 6: ACRS/ITC Expensing-Equivalent Cost Recovery

Year	G.I.	RCVRY	T.I.	PTCF	DUE	ATCF
0	$ 0.00	$ 0.00	$ 0.00	($100.00)	$ 0.00	($100.00)
1	31.55	37.00	-5.45	31.55	-2.73	34.28
2	31.55	38.00	-6.45	31.55	-3.23	34.78
3	31.55	37.00	-5.45	31.55	-2.73	34.28
4	31.55	0.00	31.55	31.55	15.78	15.78
TOT	126.20	112.00	14.20	126.20	7.09	119.12
PV_1	100.00	92.84	7.17	100.00	3.58	96.44
PV_2	111.87	101.67	10.21	111.87	5.09	106.79
IRR				**10.00%**		**8.18%**

Table 6 demonstrates three points. First, the combination of ITC and ACRS is not a true "recovery" method at all, but true cost recovery combined with a nominal tax subsidy.[76] Second, this "recovery" method produces greater

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75. The conditions required to produce expensing-equivalence under the prevailing definition depends on the after-tax discount rate, the applicable tax rate and the timing conventions used. Auerbach gives the first year depreciation deduction a present value equal to nominal value. Under the timing conventions used in this article, that is the equivalent of expensing the first year recovery deduction under every cost recovery method. Thus, ACRS recovery for three year property in Auerbach's discussion has a present value of .8842. See Auerbach, Auerbach Convention, supra note 57, at 1340 n.102, 1346. Employing the last day convention used by this article, the first year recovery deduction is not expensed and the same recovery method has a present value of only .7895. Similarly, if the ITC-equivalent deduction is treated as occurring at Time 0, the PV_2 of the ATCF becomes $7.04, and the IRR of the ATCF becomes 8.4%.

The choice of timing conventions, however, should only affect the discount rate at which a given "recovery method" becomes "expensing-equivalent." Cf. id. at 1347 (expensing equivalence for 3-year recovery property at 12% after-tax discount rate); supra Table 6 (expensing equivalence for 3-year recovery property at 5% after-tax discount rate). For a formula and a complete set of Tables presenting the combination of tax rate and after-tax discount rate at which this result pertains based on the Auerbach convention, see Johnson, Mismatch, supra note 70, at 1021-25.

76. Note that total nominal recovery deductions ($112.00) exceed nominal investment ($100.00). This is because the 6% ($6.00) ITC is the equivalent of a $12.00 deduction in Year 1 given a 50% tax rate, and this increases the Year 1 recovery deduction in Table 6 from $25.00 to $37.00 and the total recovery deductions from $100.00 to $112.00. This also causes total nominal after-tax cash flow ($119.10) to exceed the after-tax cash flow produced by all true recovery methods ($113.10) by

economic tax benefits than expensing as an income tax recovery method.[77] Third, this "recovery" method produces financial tax benefits that are greater than those produced by expensing in terms of the Net Present Value of the After-tax Cash Flow, but that are less than those produced by expensing in terms of the Internal Rate of Return of the After-tax Cash Flow.[78]

Based upon analysis of the figures in Table 5 and Table 6, the only way to achieve "expensing equivalence" in present value terms is to either adjust the ITC amount while the discount rate remains constant,[79] or for the real world discount rate to coincidentally match the specific rate that will create "expensing equivalence" for a given ITC amount.[80] Without an ITC, the only way to make multi-period "cost recovery" deductions the true equivalent of immediate expensing is to provide sufficient additional cost recovery deductions during the course of the investment for the after-tax present value of those deductions to equal the amount invested.[81] This is also the underlying

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$6.00 (due to the 50% tax rate). Compare Table 1 and Table 5 supra, which show economic depreciation and theoretical expensing as a recovery method, respectively. Both show nominal ATCFs of $13.10.

77. In nominal dollar terms, this structure's after-tax benefits exceed those provided by theoretical instantaneous expensing as a recovery method since the total net after-tax cash flow in Table 6 ($19.12) exceeds the total after-tax cash flow in Table 5 ($13.10). Compare supra Table 1 (economic depreciation), Table 2 (ACRS), Table 3 (MACRS), and Table 4 (Year End Expensing) all of which have net after-tax cash flows of $13.10.

78. The present value of the net after-tax cash flow of $6.79 in Table 6 exceeds that of the $5.93 generated by instantaneous expensing as a recovery method in Table 5. This is caused by the duplicate recovery of a portion of the asset's basis through the combination of the ITC and ACRS. However, the IRR of the After-tax Cash Flow in Table 6 (8.18%) is less than that of the Pre-tax Cash Flow (10.00%). Since the IRR of the ATCF is less than 10%, a positive effective tax rate is being applied to the income produced by the investment in present value terms. That tax rate is the PTCF IRR (10.00) minus the ATCF IRR (8.18) or approximately 18.2%. Expensing as a recovery method, on the other hand, produces a zero IRR effective tax rate because under similar circumstances the IRR of both the pre-tax and after-tax cash flows was 10%. See supra Table 5 and text accompanying supra note 68.

79. For example, if the ITC were reduced to 5.13% the NPV of the ATCF would equal $5.93, which matches the NPV of the theoretical expensing transaction portrayed in Table 5. However, the IRR of the ATCF would still only equal 7.77%. Thus, the transaction would still not be totally "expensing equivalent."

80. A process of iteration shows that the net present value of the after-tax cash flow would be $5.92 (approximately the same amount as in Table 5) at an after-tax discount rate of 5.38%. However, the IRR of the after-tax cash flow would remain unchanged.

81. The "Cary Brown hypothesis," employed only one discount rate for both before and after-tax financial measurements. See supra note 23 for full citation and infra Part V.A. for a full discussion and analysis. This differs from Table 6, in which the after-tax, but not the pre-tax, present value of the recovery/ITC stream equals the amount invested.

structural and accounting principle of capital income taxation in a cash flow consumption tax.[82]

F. *A Preliminary Comparative Analysis: Net Present Value, Internal Rate of Return and Financial Effective Tax Rates*

Accelerated recovery methods reduce the PV_2 of the tax burden attributable to the income produced by a given amount of investment relative to economic cost recovery, and simultaneously increase the PV_2 of the After-tax Cash Flow (ATCF). The sum of the PV_2 of the Tax Paid and the ATCF, however, remains constant. The following Table illustrates this by totaling the PV_2 of the Tax Paid and After-tax Cash Flow columns portrayed in Table 1 through Table 5, respectively.[83]

Table 7: Relative Impact of Recovery Methods Upon PV_2 of ATCF and Tax Paid

Recovery Method	PV_2 Tax Paid	Net PV_2 ATCF	Total PV_2s
1-Economic	11.86	0.00	11.86
2-ACRS	10.80	1.04	11.84
3-MACRS	10.46	1.41	11.87
5-Real World Exp	8.33	3.57	11.90
4-Theory Exp	5.93	5.93	11.86

In Table 1 (economic depreciation), the PV_2 of Tax Paid was \$11.86, but the PV_2 of the ATCF was \$0.00. Under ACRS and MACRS, the PV_2 of Tax Paid decreased relative to economic depreciation, but the PV_2 of the After-tax Cash Flow increased by the amount of that decrease. Thus, the sum of both amounts remained fixed at approximately \$11.86.[84] Finally, in Table 5, the PV_2 of the Tax Paid decreased from \$11.86 to \$5.93 relative to economic depreciation, and the ATCF increased from \$0.00 to \$5.93, again preserving the total of \$11.86. Thus, the decrease in the after-tax present value of Tax Paid by a given amount of investment in a RBIT base as depreciation accelerates from

82. See Blueprints, supra note 1, at 123-24; Michael J. Graetz, Implementing a Progressive Consumption Tax, 92 Harv. L. Rev. 1575, 1598-1611 (1979) [hereinafter Graetz, Implementing].

83. Rounding errors create the small discrepancies among the amounts in the Total PV_2 column.

84. Cumulative rounding errors cause the total PV_2s to deviate slightly from the average of \$11.86.

economic to expensing ($11.86 to $5.93) is exactly offset by a corresponding increase in the present value of the After-tax Cash Flow ($0.00 to $5.93).

Modern financial analysis focuses on the relative ability of accelerated cost recovery methods to increase the net present value of the after-tax cash flow (NPV_2 ATCF) produced by investments using an after-tax discount rate.[85] Modern analysis also focuses on the impact accelerated cost recovery methods have on the internal rate of return of the after-tax cash flow (IRR_2 ATCF) produced by similar investments. Each financial criterion allows the computation of an effective tax rate (ETR) that can differ substantially from the nominal tax rate. A comparative analysis of these effective tax rates adds considerably to our understanding of the financial effects produced by various cost recovery methods. Table 8 below shows the elements that go into the computation of financial effective tax rates for each of the RBIT cost recovery methods examined so far. This Table ranks the RBIT base recovery methods analyzed in Part II from the slowest to the fastest in order of the increasing amounts of the NPV_2 of their ATCFs.[86]

Table 8: Modern Financial Analysis: After-Tax Financial Yield[87]

Recovery Method	NPV_1 PTCF	NPV_2 PTCF	NPV_2 TAX	NPV_2 ATCF	NPV_2 ETR	IRR PTCF	IRR ATCF	IRR ETR
Econ	0.00	**11.86**	**11.86**	**0.00**	100%	10.0%	5.0%	50.0%
ACRS	0.00	**11.86**	**10.80**	**1.04**	91.2%	10.0%	5.48%	45.2%
MACRS	0.00	**11.86**	**10.46**	**1.41**	88.1%	10.0%	5.67%	43.3%
Yr End Exp	0.00	**11.86**	**8.33**	**3.57**	69.9%	10.0%	7.11%	28.9%
Theory Exp	0.00	**11.86**	**5.93**	**5.93**	50%	10.0%	10.0%	0.0%

85. See e.g., Johnson, Soft Money, supra note 22, at 1019.

86. See the fifth column in infra Table 8.

87. From left to right, the columns contain the following information about each of those recovery methods: (1) Name of recovery method; (2) Pre-tax net present value of the pre-tax cash flow (NPV_1 PTCF); (3) After-tax net present value of the pre-tax cash flow (NPV_2 ATCF); (4) Net after-tax present value of the tax paid (NPV_2 TAX); and (5) After-tax present value of the after-tax cash flow (NPV_2 ATCF). Columns 2 and 3 show that there is a fixed difference of $11.86 between the pre-tax and after-tax net present values of the pre-tax cash flow. Those net present values are computed using 10% and 5% discount rates, respectively. Columns 4 and 5 show that the NPV_2 of the Tax Paid and the After-tax Cash Flow vary inversely to each other, but always total $11.86. Column 6 computes the "NPV_2 Effective Tax Rate" (NPV_2 ETR). The last three columns contain the following information for each cost recovery method: (7) Internal Rate of Return of the PTCF (IRR PTCF or IRR_1); (8) Internal Rate of Return of the ATCF (IRR ATCF or IRR_2); and (9) the "IRR Effective Tax Rate" (IRR ETR). See discussions of these financial criteria, text accompanying supra notes 33-37 and 45-50.

The fact that economic depreciation and expensing lie at opposite ends of a spectrum of recovery methods as Warren predicted can be seen in many ways. For example, a modern financial analysis of the income tax recovery methods examined so far would rank them from the "slowest" (economic) to the "fastest" (expensing) according to: (1) the increasing order of the net after-tax present value of the After-tax Cash Flow (NPV_2 ATCF); (2) the increasing order of the IRR of the ATCF; and (3) the decreasing order of the Effective Tax Rate (ETR) as measured by both methods.

Not present value (NPV) and internal rate of return (IRR) are very different indicators of effective tax rates. For example, the IRR of the ATCF for Economic Depreciation in Table 8 is exactly 5%. Because the IRR of the Pre-tax Cash Flow (PTCF) is 10%, economic depreciation produces an IRR effective tax rate (IRR ETR) that is exactly equal to the nominal tax rate of 50%. In other words, the *rate* of financial return before tax (10%) is reduced exactly by the tax rate in order to produce the appropriately reduced rate of financial return on this investment after tax (5%).[88]

Effective tax rates that are computed by using net present value tell a different story. The key elements in computing NPV ETR are: (1) the NPV_2 of the PTCF; (2) the NPV_2 of Tax Paid; and (3) the NPV_2 of the ATCF. NPV ETR is computed by using the formula:

$$\text{NPV ETR} = \frac{\text{NPV}_2\ \text{Tax}}{\text{NPV}_2\ \text{Tax} + \text{NPV}_2\ \text{ATCF.}}$$

As Table 8 shows, in the context of a financially break-even investment, Element 1 always equals the sum of Elements 2 and 3, regardless of the cost recovery method employed, so the denominator can be simplified and re-written as:

$$\text{NPV ETR} = \frac{\text{NPV}_2\ \text{Tax}}{\text{NPV}_2\ \text{PTCF.}}$$

When using NPV ETR under financially ideal conditions, the basic criterion of accuracy is the extent to which the NPV effective tax rate produced by a given cost recovery method coincides with the nominal tax rate. Therefore, if one begins with the NPV_2 of the PTCF ($11.86), and computes the fraction NPV_2 Tax/NPV_2 PTCF, one quickly sees that economic depreciation causes 100% of the after-tax net present value of the after-tax cash flow to be paid in tax, producing an NPV ETR of 100%.

As cost recovery methods accelerate, the NPV_2 of the ATCF increases while the NPV_2 of the PTCF remains constant. As a result, the NPV ETR

88. See text accompanying infra notes 149-52.

decreases.[89] Under expensing, the NPV_2 of the ATCF is maximized at $5.93; and this produces an NPV ETR of 50%. Similarly, as cost recovery methods accelerate, the IRR of the ATCF increases relative to the IRR of the PTCF, and therefore, the IRR effective tax rate decreases.[90] As a result, under expensing, the IRR of the ATCF matches the IRR of the PTCF at 10%; therefore, the effective rate of tax using IRR becomes 0% because the pre-tax financial *rate* of return is not decreased at all by taxation.

The tax literature historically uses actual nominal tax liabilities in computing effective, as opposed to statutory, tax rates.[91] The same literature tends to use Internal Rate of Return when using effective tax rate as a financial analytical tool.[92] However, the finance literature largely views Net Present Value as a more accurate comparative financial indicator than Internal Rate of Return for purposes of evaluating competing comparable investment opportunities,[93] and some tax literature has begun to follow suit.[94] These two financial indicators serve different purposes in measuring and conveying various types of financial information. This article uses both indicators in its comparative analysis of the three tax bases – AMIT, CFIT and RBIT – as well as in its comparative analysis of RBIT base cost recovery methods. Additional financial indicators will also be used as the need arises during the course of those comparative analyses. Overall, the conclusions in this article are based on the financial evaluative factors that seem to be most appropriate and accurate for each analytical context.

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89. As NPV_2 ATCF increases, NPV_2 Tax must decrease, so the fraction NPV_2 Tax/NPV_2 PTCF must decrease as well.

90. This occurs because the formula for IRR ETR is IRR ATCF/IRR PTCF (IRR_2/IRR_1).

91. For a very accessible explanation of some of the issues involved in the computation of nominal effective tax rates, see Seymour Fiekowsky, Pitfalls In The Computation Of "Effective Tax Rates" Paid by Corporations, Office of Tax Analysis Paper 23 (July 1977), reprinted in OTA Papers: Compilation of OTA Papers, Volume 1 (1978).

92. For an equally lucid explanation of the process involved in computing financial effective tax rates, see Jane Gravelle, The Economic Effects Of Taxing Capital Income, Appendix B, 287-89 (1994).

93. See Brealey & Myers, supra note 33, at 101-08.

94. See Johnson, Soft Money, supra note 22, at 1041, n.85 (pointing out the serious limitations of IRR analysis on investment return comparisons); Michael S. Knoll, The UCLA Tax Policy Conference: Designing a Hybrid Income–Consumption Tax, 41 UCLA L. Rev. 1791, 1799, n.29 (1994) (pointing out four reasons why net present value should be used instead of IRR in comparing capital income taxation regimes). Overall, this article performs an extensive NPV analysis comparing income and consumption tax treatment of capital income.

III. COMPARATIVE CAPITAL INCOME TAXATION PRINCIPLES

With respect to the taxation of capital income, AMIT, CFIT and RBIT structural and accounting principles address three common issues: First, whether and how to tax the source of investment; second, whether and how to tax the economic yield from investment; and third, whether and how to allow tax-free recovery of investment. Within a given tax base the answers to these questions should be consistent with each other and with the fundamental structural and accounting principles of that particular tax base.

A. *Accretion-Measured Income Tax (AMIT)*

The structure of an AMIT base is defined by the equation $I = C + \Delta W$, where I equals income, C equals consumption, and ΔW equals change in wealth.[95] The purpose of the formula is to measure the increased capacity for consumption created by positive changes in net wealth, and the decreased capacity for consumption created by negative changes in net wealth. Theoretically, the consumption of wealth *per se* is also includible in the tax base, but as a practical matter this inclusion produces no net change in the tax base because any current increase in consumption causes an equal and offsetting decrease in wealth. Ultimately, the AMIT base consists of net accretions or decreases in wealth. "Income" is simply the source (and therefore the sum) of both consumption and accretions to wealth.

An AMIT base taxes the source of investment as well as the economic yield produced by investment because both create increases in wealth. However, an AMIT base does not allow tax-free recovery of investment. Thus, in an AMIT base neither the acquisition nor disposition of an asset is given structural or accounting significance as such unless the taxpayer's total store of wealth is changed as a result. For example, the acquisition of a depreciable asset financed with equity creates no change in the investor's net economic or financial wealth if the investment is a break-even investment.[96] If savings are used, the investment simply represents a new form of the previous wealth. If current year earnings are used, the increase in wealth represented by those earnings is transformed into the depreciable asset, but the amount of the initial increase in wealth is neither increased nor decreased by the change in form of that wealth. Therefore, the tax base is increased by virtue of the earnings, but it is not reduced because those earnings were invested. This feature of an AMIT base

95. See Simons, supra note 1, at 50.

96. Bargain purchases could produce an increase in economic wealth, and the use of below-market financing could produce an increase in financial wealth. The break-even investments used in this article, however, produce no change in economic or financial wealth.

produces what is often referred to as a "double tax" on investment.[97] For example, if an AMIT taxpayer earns $200 in Year 0, the maximum amount that the taxpayer can invest from those earnings is the amount remaining after those earnings are subject to tax. If the tax rate is 50%, an AMIT taxpayer can only invest $100 after tax.

During the holding period of a depreciable asset within an AMIT base, the gross economic yield produced by the asset increases wealth, while the decline in the asset's value decreases wealth. The net yield produced by the asset may either increase or decrease net wealth relative to the initial value of the asset, or net wealth may remain unchanged. The primary purpose of economic depreciation in an AMIT base is not to recover the cost of an asset tax-free, but to assist in periodically measuring the overall W factor in the Haig-Simons definition of income.[98] In the case of a self-exhausting asset, annual economic depreciation deductions represent the actual decline in the asset's value during each successive taxable period.[99] If, as in Table 1, the investment is a break-even investment because the asset's yield rate equals the pre-tax discount rate, that investment has a NPV of 0 before tax using the pre-tax discount rate, and an NPV of 0 after-tax using the after-tax discount rate. Both figures are appropriate and correct for an AMIT base. Because no net wealth is created before tax, either at acquisition or during the holding period of the asset, no net wealth is created after tax. Economic depreciation is the only type of depreciation accounting that produces this structurally correct result in an AMIT base.

B. *Cash Flow Income Tax (CFIT)*

While an AMIT base is structured to tax consumption and the ability to consume and can be accounted for through a balance sheet approach, a CFIT base is structured to tax actual consumption and can be accounted for through a cash flow statement approach. In other words, a CFIT base can be expressed as the formula Tax Base = Consumption rather than Tax Base = Consumption + W. Consumption, in turn, can be expressed as Earnings – Investment if all non-invested or non-saved Earnings are deemed to be consumed. A CFIT base is a simplified type of consumption tax base and is basically structured to tax Earnings – Investment. As a result, it has been said that a consumption tax is a

97. John Stuart Mill first called the income tax a "double tax on savings." John S. Mill, Principles of Political Economy 814 (Sir William Ashley ed., Augustus M. Kelley Publishers 1973) (1848).

98. Under an AMIT base, the purpose of economic depreciation is not to directly measure the net capital income produced by specific assets, although it plays an important role in that process.

99. The Chirelstein convention is a simplified theoretical way to measure the decline in value of real depreciable assets with the kinds of relatively predictable income streams that are associated with most financial assets.

tax on earnings but not on investment, while an income tax is a tax on both earnings and investment.[100]

Under one of its two major approaches to capital income taxation, a CFIT base does *not* tax the source of investment but completely taxes investment yield.[101] Because the source of investment (earnings for example) is not taxed, there is no after tax cost to recover tax-free subsequent to the act of investing.[102]

Under this version of CFIT base capital income taxation, the act of investing in a real exhausting asset is simply accounted for as a negative cash flow. Structurally, investment is treated as a reduction of funds available for consumption, and therefore, as a reduction in the tax base for the relevant period. Conversely, the yield stream produced by that real asset is accounted for solely as a positive cash flow, and structurally as an increase in funds available for consumption, and therefore, as an increase in the tax base. Thus, for capital income taxation purposes, none of the funds used to make the initial investment are taxed, but all the income produced by the investment is taxed – unless additional investment is made with that income.

This approach to tax base accounting completely separates the accounting for investment *in* a depreciable asset from accounting for the income produced *by* that asset. After the investment is accounted for as a tax base reduction, no further tax base structural or accounting significance is given to that asset. Its value is not accounted for periodically, as in an AMIT base, and its original cost and value become irrelevant. If an asset is disposed of for value, the entire amount received for the asset is included in the tax base for that taxable period unless and to the extent the disposition proceeds are reinvested.

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100. See Alvin C. Warren, Jr., Fairness and a Consumption–Type or Cash Flow Personal Income Tax, 88 Harv. L. Rev. 931, 938-41 (1975); cf. William Andrews, Fairness and the Personal Income Tax: A Reply to Professor Warren, 88 Harv. L. Rev. 947 (1975).

101. Traditionally, two versions of a cash flow consumption tax have been proposed with respect to the taxation of the income from depreciable assets. The first version is a straightforward cash flow accounting approach in which investment in real assets is deducted from the tax base and all investment yield is included in the tax base. The second version is often called yield exemption and operates by taxing investment in an asset (like an AMIT base) but exempting the yield produced by the asset from tax. The two versions produce the same present value of tax paid, but the second version potentially allocates all windfall gains to taxpayers. In its last major study of tax base reform, the Treasury Department prohibited this treatment for real business assets, both for concern about this allocation and the difficulty of distinguishing return to capital from income from services, in the context of small businesses. See Blueprints, supra note 1, at 115-17.

102. On the other hand, to mix structural metaphors, one could characterize not taxing the source of investment as a form of ex ante tax-free cost recovery.

Because the source of investment is not taxed in this type of CFIT base, the maximum amount of earnings that can be invested in a CFIT base is greater than the maximum amount that can be invested in an AMIT base. The well-known ratio between the maximum amounts of investment in an AMIT and a CFIT base, respectively, given the same amount of earnings, is expressed as AMIT Investment x 1/1-t = CFIT Investment, where t, the tax rate, is the same in both tax bases. For example, given $200 of earnings in a taxable period, an AMIT investor, as noted above, can invest a maximum of $100 after all $200 of earnings are taxed because the tax base equals Consumption + W, and the earnings constitute an increase in wealth. A CFIT investor on the other hand can invest the entire amount of Earnings and owe no tax because the tax base equals Earnings – Investment. Thus the maximum AMIT base investment ($100) x 1/1-t (1/.5) equals the maximum CFIT base investment ($200).

C. *Realization-based Income Tax (RBIT)*

1. *General Tax Base Principles.*—The basic formula for a realization-based income tax is identical to that of an accretion-measured income tax except that both Consumption and W must be realized in order to enter the tax base.[103] In Formula 1 below, $_R$ represents the realization requirement.

Formula 1: $I_R = C_R + W_R$

Realization basically refers to the tangible receipt of wealth or consumption rather than a mere increase in the value of those items. Realized changes of wealth are usually evidenced by a conversion of an asset into money or other property differing materially in kind or extent from the asset itself. The reasons usually given for the realization requirement are founded in tax policy and administration concerns. The reasons most frequently mentioned include: (1) The cost and difficulty of performing and resolving disputes over annual valuations of each taxpayer's complete portfolio; and (2) The possibility that taxpayers might lack the ability to pay tax on accrued increases in value without being forced to partially liquidate their portfolios.[104] The realization requirement

103. In addition to the realization requirement that is applied to the W element in a RBIT base formula, the historical non-taxation of imputed income from consumption of taxpayer-owned assets or self-provided services in the U.S. RBIT implies that a realization requirement applies to the Consumption element as well. E.g., Thomas Chancellor, Imputed Income and the Ideal Income Tax, 67 Or. L. Rev. 561 (1988); Richard Goode, Imputed Rent of Owner-Occupied Dwellings Under the Income Tax, 15 J. Fin. 504 (1960).

104. Cf., Edward A. Zelinsky, For Realization: Income Taxation, Sectoral Accretionism, and the Virtue of Attainable Virtues, 19 Cardozo L. Rev. 861 (1997), and David J. Shakow, Taxation Without Realization: A Proposal for Accrual Taxation, 134 U. Pa. L. Rev. 1111 (1986).

helps to solve these problems by providing reliable evidence of value and causing the incidence of taxation to coincide with the ability to pay the tax.

Although realization may seem like a mere tax base accounting convention, it has substantial structural implications. Unlike an AMIT base, any bargain element present in an asset acquisition does not enter a RBIT base because any difference in value between the wealth used to obtain the asset and the newly acquired asset is generally not a realized change in wealth.[105] Similarly, during the asset's holding period, the interim asset values have no tax structural or accounting significance because those asset value changes are not realized until the asset's disposition.[106] And finally, the amount realized from a disposition may differ from the asset's terminal value. Therefore, the realization principle may cause significant differences in the amount as well as the timing of income or loss taken into account in a RBIT base in comparison to an AMIT base.

2. *The Role of Asset Basis.*—The realization requirement alters some, but not all, of the structural and accounting features of an AMIT base. A RBIT is still an "income" tax rather than a consumption tax. Therefore, in a manner similar to AMIT base treatment but in contrast to CFIT base treatment, investing earnings does not structurally decrease a RBIT base. As a result, investment must come from after-tax or already-taxed dollars.[107] However, in contrast to the way that an AMIT base accounts for and taxes all value fluctuations between the time of an asset's acquisition and disposition, a RBIT base only accounts for and taxes the difference between the initial amount invested and the terminal realized asset value. In other words, instead of beginning the tax base accounting process with the initial *value* of an asset at acquisition, a prototypical RBIT begins with the asset's after tax *cost* or other after-tax investment in the asset, using a tax accounting item and amount called *basis*.

Asset cost basis in a RBIT base is somewhat analogous to initial asset value in an AMIT base: both are the tax accounting starting point for measuring subsequent changes in wealth. The difference is that those future changes must

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105. "[O]ne does not subject himself to income tax by the mere purchase of property, even if at less than its true value, and that taxable gain does not accrue to him before he sells or otherwise disposes of it." Palmer v. Commissioner, 302 U.S. 63, 69 (1937). Exceptions exist under the U.S. income tax. For example, in the compensatory context, the bargain element of a purchase has been traditionally taxed to the purchaser. See Regs. § 1.61-2(d).

106. Exceptions exist here, too. See supra note 6 and accompanying text.

107. In Part IV., this article shows that RBIT base investment may come from pre-tax dollars as well, and explains how the threshold between after-tax (or capital) and pre-tax dollar investment varies with the cost recovery method employed and the tax rate imposed. Ultimately, however, the comparative analysis undertaken by this article is confined to capital-financed investment.

be realized in a RBIT base but not in an AMIT base. Administrative and evidentiary concerns justify the substitution of cost in a RBIT base for initial value in an AMIT base for the same reasons that they support the substitution of realization for incremental and terminal asset valuation as an accounting principle. Cost usually provides fairly reliable evidence of initial value but has a lower evidentiary threshold; and is a more easily administrable starting point than initial asset value. Structurally, it is appropriate because any initial disparity between cost and initial value is generally not a realization event and a bargain purchase does not generally impact a RBIT base.[108]

At the time of the asset's disposition, the realization doctrine finally requires the taxpayer to account for the difference between the initial cost or other basis of the asset and the realized terminal value. However, if a disposition, though causing realization, is one which Congress has decided warrants deferral of tax, then that gain or loss is not then "recognized" by the tax system. Instead, the basis in the disposed asset is exchanged for identical basis in a new asset, or the old basis is transferred to a new taxpayer along with the asset.[109] As an asset (or its successor) moves through the tax system, its tax basis moves along with it as an ongoing measure of the continuing amount of after-tax (or already-taxed) dollars invested in the asset. When a taxable disposition occurs (one in which gain or loss is both realized and recognized), the difference between the original basis (plus or minus any adjustments to that basis allowed for certain intervening events)[110] and the amount realized produces either an increase or a decrease in the taxable income of the taxpayer disposing of the asset at that time.

3. *RBIT Capital Income Taxation Principles.*—As a result of the tax base accounting element of asset basis, a transactional method of accounting for the taxation of capital income from depreciable assets in a RBIT must address two possible components of that income: a self-exhausting income-producing asset, and the realized income produced by that asset. Unlike an AMIT, unrealized declines in an asset's value during its period of productivity need not *and should not* be accounted for as decreases in the tax base. This is why tax policy makers should not assume that economic depreciation as a cost recovery method is the tax base structural or accounting paradigm for measuring and taxing capital income within the U.S. RBIT base. On the other hand, unlike a CFIT base, the U.S. RBIT measures neither capital investment nor capital income simply on the basis of cash flows. Because unlimited expensing is a

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108. Cf. supra note 105 and accompanying text.

109. See IRC § 7701(a), paragraphs 43 (Transferred Basis Property), and 44 (Exchanged Basis Property). Both are examples of what § 7701(a)(42) defines as Substituted Basis Property.

110. See IRC § 1016.

surrogate for cash flow accounting, policy makers should not assume that it is the correct paradigm either.[111]

Rather, the fundamental feature of capital income taxation under the U.S. RBIT base is that of tax-free capital cost recovery. Because a RBIT base, like an AMIT base, taxes invested earnings, it is necessary to recoup or recover those taxed invested earnings at some point in time from otherwise taxable realized income. Otherwise, a RBIT would tax invested earnings twice, an AMIT once, and a CFIT not at all. Like an AMIT, a RBIT is a tax on net *increases* in wealth, not a tax on capital (or after-tax wealth) *per se*.[112] However, unlike an AMIT, which measures and taxes all changes in wealth between acquisition and disposition, RBIT income is measured by the difference between already-taxed dollars invested in an asset at the time of its acquisition, as measured by an asset's basis, and the terminal realized value (amount realized) of the asset at the time of its disposition or other realization event. Basis in a RBIT is somewhat analogous to the initial value of an acquired asset in an AMIT. If the asset produces net cumulative income or appreciates in value, the initial value (or basis) of the asset is not taxed again – only the difference between the initial value (or basis) and the asset's terminal (realized) value enters the tax base.

Under the broadest articulation of this paradigm, a RBIT base taxpayer is normatively entitled to completely recover his or her after-tax dollar investment in a real asset from otherwise taxable gross income through the medium of some form of tax base reduction equal in amount to the after-tax dollar investment in the asset at some point in time.

4. *The Role of Cost Recovery Deductions.*—Within the U.S. RBIT, cost recovery deductions further the dual purpose of accounting for *both* the wasting investment in a productive asset *and* the net income produced by the asset. This is in contrast to both an AMIT, which uses economic depreciation solely to account for fluctuations in value of the underlying asset, and a CFIT, which uses offsetting cash flows to separately account for the initial investment (tax base decrease) and the subsequent economic yield (tax base increase) produced by a productive asset.

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111. Strnad argues that cash flow accounting, which has the same financial and economic effects as expensing, measures W within a Haig-Simons AMIT base better than economic depreciation. This assertion has been hotly disputed by Professors Warren, Kaplow, and Popkin. See discussion supra note 5. This article takes the position that expensing more accurately measures capital income within a CFIT base than economic depreciation, but does not consider expensing's impact on the measurement of W to be the reason.

112. In other words, a realization-based income tax is not an excise tax on investment coupled with an income tax on both earnings and capital income.

If an asset has an indeterminate economic life, such as corporate stock, a RBIT base accounting for the difference between the initial cost and the terminal realized value cannot take place until disposition of the asset, at which time the full unreduced cost basis is utilized as an offset against the amount realized. This is appropriate structural treatment for such assets because a RBIT does not take into account interim unrealized fluctuations in asset value. However, the deferral of the tax base accounting for gain or loss caused by the realization requirement creates a well-recognized financial distortion when compared to an AMIT base that measures and taxes those interim fluctuations prior to disposition.[113]

On the other hand, if an asset is self-exhausting (physically or economically) and has a reasonably known and limited economic life, deferring all cost recovery until abandonment or disposition of the asset causes a similar financial distortion in the tax base that is not a product of the realization requirement. The issue is not when and how to account for the diminution in value of the asset but how to provide for the tax-free recovery of its capital cost through an offset against the tax base. In addition to being theoretically proper, it is not administratively impractical to allow an appropriate portion of the cost basis to be recovered tax-free through the medium of cost-recovery deductions prior to realization of the asset's terminal value through disposition or abandonment. Such treatment is particularly apt if that terminal value will approximate zero because there may be insufficient taxable income in the year of disposition to offset the deduction, resulting in incomplete recovery of capital.

Logically, there are three ways that RBIT base accounting could approach capital cost recovery. As already mentioned, it could wait until disposition or abandonment of the asset, at which time a loss would be realized if the unadjusted basis account was treated as an offset against the tax base. Second, it could allocate a portion of the initial cost to each period of the anticipated economic life of the asset, allow a deduction for each year's cost allocation, and adjust the unrecovered cost account (basis) downward to reflect cost recovery deductions that take place prior to disposition. Third, it could recover the cost at the time of the asset's acquisition by allowing a deduction for the full cost of such an asset at that time and essentially reducing the basis of the asset to zero at the same time.

Throughout the history of the U.S. RBIT, the second method has dominated tax law and policy. That history began with an initial policy notion to simulate economic depreciation in an AMIT base by utilizing "economic depreciation" *deductions* in the RBIT base.[114] As appreciation of the financial effects of cost recovery systems grew, Congress began to enact accelerated cost

113. See Schenk, supra note 15, and works cited therein.

114. See Graetz, supra note 14; Henry J. Lischer, Depreciation Policy: Whither Thou Goest?, 32 Sw. L.J. 545, 546, 555 (1978).

recovery methods. Ultimately, Congress began to cast RBIT base cost recovery policy adrift from its moorings in AMIT-based economic deprecation rationales.[115] Both Congress and the Courts, for example, have allowed tax-free cost recovery with respect to assets with no ascertainably finite or measurable economic lives,[116] and the Tax Court has even allowed accelerated cost recovery deductions with respect to possibly appreciating assets.[117] In recent years, the third type of cost recovery – immediate expensing – has received increasing legislative support, especially for tangible, self-exhausting assets with relatively short economic lives.[118]

D. *Defining the Criteria for Normative RBIT Base Cost Recovery*

In choosing a normative RBIT base cost recovery method for the types of depreciable assets discussed in this article, two related normative policy criteria should be satisfied. First, taxpayers should recover the entire cost of their capital investments tax-free in financial terms. The rationale for this criterion is that a normative capital cost recovery method should distinguish capital from income, and tax only the latter. A RBIT base is a variant of an AMIT base, and as noted earlier, the consumption of capital *per se* is not generally subject to tax in an AMIT base.[119] This is in contrast to a CFIT base, which taxes the consumption of either new or old wealth.[120] Nothing about the

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115. E.g., S. Rep. No. 97-144, at 47-48 (1981) (tax policy rationale for short ACRS recovery periods was to stimulate investment).

116. See Simon v. Commissioner, 103 T.C. 247, 248 (1994) (en banc), aff'd, 68 F.3d 41 (2d Cir. 1995); Liddle v. Commissioner, 103 T.C. 285, aff'd, 65 F.3d 329 (3d Cir. 1995) (both cases allowing professional violinists to use ACRS cost recovery deductions with respect to instruments that were collector's items and had no ascertainable useful life). See also IRC § 197 (allowing amortization of previously unamortizable intangible assets that have no ascertainable useful life). See generally Alton A. Murakami, "Useful Life" Has Outlived Its Useful Life: Tax Depreciation after Simon and Liddle, 72 N.Y.U. L. Rev. 1211 (1997); Anthony P. Polito, Fiddlers on the Tax: Depreciation of Antique Instruments Invites Reexamination of Broader Tax Policy, 13 Am. J. Tax Pol'y 87 (1996).

117. See *Simon*, 103 T.C. at 252.

118. E.g., Invest More in America Act, S. 76, 105th Cong. (increasing the § 179 expensing limitation from $25,000 to $250,000); S. 3225, 102nd Cong. (increasing the § 179 expensing limitation to $100,000); Economic Assistance and Workers Security Act of 2001 (H.R. 3529, December 20, 2001) (increasing the § 179 limitation to $35,000 and granting a temporary expensing deduction under § 167(a) for many assets with less than a 20-year recovery period equal to 30% of the asset's adjusted basis if acquired after September 11, 2001 and before September 11, 2004).

119. See generally supra Part III.A. See also supra note 112 and accompanying text.

120. Compare the formulas for AMIT and RBIT bases on one hand to that of a CFIT base on the other. Both income and consumption bases tax consumption, but the

realization requirement, which only creates a subset of the Consumption and W factors in the AMIT base formula, should alter this principle of income taxation in a RBIT. To the extent that a cost recovery method does not fully recover capital costs, either at acquisition, during the holding period of the asset, or at disposition, a RBIT will tax capital again as opposed to taxing income. This is structurally inappropriate for either an AMIT or a RBIT base.

This leads directly to the articulation of the second criterion: a normative capital cost recovery method should cause income to be taxed appropriately in relation to the tax base structural and accounting principles that underlie a RBIT. Therefore, only net *realized* income should be taxed. The use of accretion or cash flow accounting, or the recognition of imputed income is inconsistent with the structural or accounting principles of a RBIT base. As noted earlier, an AMIT base taxes invested earnings at the time of their investment (which distinguishes it from a CFIT base), and should only tax accrued changes in the value of that after-tax wealth thereafter. A RBIT base should operate in a similar fashion at the time of investment but only subsequent *realized* rather than *accrued* accessions to wealth should be taxed thereafter.

IV. CAPITAL FORMATION AND CAPITAL COST RECOVERY IN A REALIZATION-BASED INCOME TAX

A. *The Effect of Cost Recovery Methods on Loss Offsets and Capital Investment*

In order to focus exclusively on comparative cost recovery method issues, this article assumes that all RBIT base investments herein are cash-financed and are purchased with capital, which is defined for purposes of this article as actual after-tax dollars.[121] This sort of investment can arise in at least two situations: savings-financed investment and investment financed from contemporaneous after-tax earnings.

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reciprocal impact on the W factor in an income tax base negates the inclusion of consumption in an AMIT. The additional realization requirement applied to consumption in a RBIT base removes even more consumption from the tax base.

121. This definition is probably stricter than necessary. In the broadest sense, asset basis, and therefore cost recovery deductions, may correspond to previously taxed dollars and not necessarily or exclusively to after-tax dollars. For example, a taxpayer's basis in property purchased for less than its fair market value in a compensatory context includes both the amount paid and the amount taxed to the taxpayer upon receipt (the excess of the asset's fair market value over the amount paid for it). See Regs. § 1.61-2(d)(2). In other words, the meaning of "capital" within a RBIT base includes taxed dollars as well as after-tax dollars. See generally Glen A. Kohl, The Identification Theory of Basis, 40 Tax L. Rev. 623 (1985).

Each cost recovery method, ranging in speed from economic to expensing, involves a trade-off between the amount of earnings that is offset and the amount of asset yield that is offset during the asset's holding period. For example, Table 9 below shows that the spectrum runs from economic cost recovery, which recovers no cost from earnings and all from asset yield, to expensing, which recovers all cost from earnings and none from asset yield. This Table also shows that when both Earnings and Asset Yield are taken into account, every RBIT base cost recovery method creates the same net amount of Taxable Income, Tax and After-tax Cash Flow over the total life of the combined earning and investment cycle.

Table 9: Comparative Non-Asset Income Offsets for RBIT Base Cost Recovery Methods

Recovery Method	Non-Asset T.I.	Asset T.I.	**Total T.I.**	**Tax**	**ATCF**
Economic	100 – 0 = 100	126.20-100=26.20	126.20	63.10	63.10
ACRS	100-11.90=88.10	126.20-88.10=38.10	126.20	63.10	63.10
MACRS	100-14.68=85.32	126.20-85.32=40.88	126.20	63.10	63.10
Yr End Expensing	100-68.45=31.55	126.20-31.55=94.65	126.20	63.10	63.10
Theoretical Expg	100 – 100 = 0	126 - 0 = 126	126.20	63.10	63.10

However, the amount of the initial investment that can be financed *from after-tax earnings* depends upon the amount of loss offset and consequent tax savings created by a given cost recovery method in the year earnings are invested. Because different amounts of loss offset and tax savings are produced by various cost recovery methods in the year of investment, each cost recovery method permits a different amount of after-tax investment to be made from a given amount of earnings. This insight is borne out by Table 10 below, which shows the effect of investing $100 from $200 of current earnings in a RBIT base using the same spectrum of cost recovery methods that were analyzed in Part II and Table 9 above. This analysis produces different results because ACRS and MACRS, while offsetting non-asset earnings in Years 2 and 3, offset little or no earnings in Year 1.

Table 10: Comparative Loss Offset and After-tax Investment for RBIT Cost Recovery Methods

Recovery Method	Earnings	Investment	Loss Offset[122]	T.I.[123]	Tax Paid	ATCF[124]	After-tax Investment[125]
Economic	200.00	100.00	0.00	200.00	100.00	0.00	**100.00**
ACRS	200.00	100.00	0.00	200.00	100.00	0.00	**100.00**
MACRS	200.00	100.00	1.78	198.22	99.11	0..89	**99.55**
Yr End Exp	200.00	100.00	68.45	131.55	65.78	34.22	**65.78**
Theor Expg	200.00	100.00	100.00	100.00	50.00	50.00	**50.00**

Table 10 shows that the amount of after-tax dollar (or capital) investment that can occur in a RBIT base in the year a fixed amount of earnings is invested depends directly on the cost recovery method employed. For a given amount of investment, economic cost recovery produces the most investment from capital (e.g., $100 in Table 10), and expensing produces the least (e.g., $50 in Table 10). These results stem from the fact that economic cost recovery produces no loss offset in the year earnings are invested, while expensing produces a loss offset equal to the entire amount invested. The various accelerated cost recovery methods create amounts of capital investment that fall in between the extremes of economic cost recovery and expensing. Thus, there is an inverse relationship between loss offset and capital generation: the greater the loss offset a cost recovery method produces the less capital that cost recovery method allows to be invested in an asset of a given cost.

B. *Cost Recovery Methods and the Maximum Capital Investment from Earnings in a RBIT Base*

In order to comparatively analyze capital cost recovery methods *as such* relative to the two criteria for a normative RBIT capital cost recovery method described above, the analysis must be restricted to situations where only capital is invested, regardless of the cost recovery method employed.[126] As Table 10 showed, expensing as a cost recovery method produces the least relative amount of capital in the year of investment among all cost recovery methods. Therefore,

122. Deduction against non-asset T.I. in Year 1 only.
123. Earnings minus Loss Offset.
124. Earnings minus Investment minus Tax Paid.
125. (Earnings - Loss Offset) x (l – t). See discussion in next Part IV.B.
126. This situation is also necessitated by the fact that the first criterion for a normative cost recovery method requires the ability to identify and measure the amount of capital invested, and the second criterion requires the ability to distinguish the recovery of capital from realized income.

the comparative analysis of capital cost recovery methods in Parts V and VI should be restricted to investments of that relative amount, regardless of the cost recovery method employed. That amount can be expressed both as a nominal amount and as a percentage relative to Earnings.

In reviewing the dynamics of Table 10, we can see that each cost recovery method produces capital (after-tax investment) from earnings according to the following formula:

Formula 2: Capital = (Earnings – Loss Offset) x (1 – t)

where t equals the tax rate. Practically speaking, capital in this context consists of after-tax dollars – the amount remaining after tax has been paid on Taxable Income.[127] Where a cost recovery method creates a loss offset against earnings in the year of investment, the amounts of both taxable income and capital are reduced by the loss offset. Economic cost recovery produces no loss offset and therefore no reduction in the capital produced from Earnings *per se*. Under economic cost recovery in Table 10, Capital equals ($200 Earnings - $0 Loss Offset) x (1 – t), or $100.

As cost recovery methods become accelerated, however, and cost recovery deductions begin to offset Earnings in the year of investment or thereafter, taxable income is reduced along with after-tax capital. In the extreme case, expensing produces capital from earnings according to the following formula, which is a variation of Formula 2:

Formula 3: Capital = (Earnings – Investment) x (1 – t)

As Table 10 showed, the loss offset amount for expensing is the entire amount invested, so the term Investment in Formula 3 can be substituted for the term Loss Offset in Formula 2. For example, in Table 10 the after-tax investment in the case of the expensed investment is only $50 because the entire amount invested ($100) is allowed to offset otherwise taxable income. Since expensing as a cost recovery method only allows the production of $50 of capital after tax, the amount invested ($100) exceeds the amount of after-tax dollars generated and the capital available for investment from Earnings. Thus, the entire investment is *not* financed by after-tax dollars, or capital. This is not normative RBIT base taxation. It is part normative RBIT base taxation and part normative CFIT base taxation.[128]

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127. Earnings equal $200 in every case, and taxable income equals earnings minus the loss offset. Cost recovery deductions must exceed any income produced by the asset in the year of investment in order to produce a loss offset. See supra Table 10.

128. It appears to be RBIT taxation to the extent of the $50 of capital invested and recovered tax-free, and CFIT taxation to the extent of the $50 balance of untaxed earnings created by the expensing deduction and loss offset. Most commentators to date have assumed that expensing deductions offset untaxed earnings exclusively when

In order to determine the maximum amount of after-tax dollar investment that expensing allows to be produced from a given amount of earnings at a given tax rate, we must set up and solve the following equation for maximum investment (I_{max}).

Formula 4: $I_{max} = (E - I)(1 - t)$

Solution:
$I_{max} = E - Et - I + It$
$2I - It = E - Et$
$I(2 - t) = E(1 - t)$
Divide both sides by 2-t, and the result is:

Formula 5: $I_{max} = E(1 - t)/(2 - t)$

For example, if E equals \$300 and t = 50%, I_{max} = \$300(.5)/(2-.5) or \$150/1.5, which equals \$100. Each cost recovery method produces a unique natural capital formation threshold, below which all RBIT base investment subject to that recovery method must be capital investment. Given \$300 of current earnings, for example, the maximum amount of after-tax dollar investment possible in an AMIT base or RBIT base that uses economic cost recovery is \$150,[129] but the maximum amount of after-tax dollar investment that is possible in a RBIT that uses expensing is only \$100.[130] Because expensing allows the formation of the least amount of capital, I_{max} is also the maximum amount of capital that can be invested from earnings under *every* cost recovery method in a RBIT. In other words, I_{max} equals Capital Investment$_{max}$, the maximum amount of capital that can be invested from earnings in a RBIT regardless of the cost recovery method employed.

All of the investments analyzed from this point forward are made with Capital Investment$_{max}$ or less. This amount represents the overall natural capital

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comparing economic cost recovery to expensing or in commenting on the effects of expensing in a RBIT base in general. See Johnson, Soft Money, supra note 22, at 1024-27; Warren, Arbitrage, supra note 58, at 551-55. This assumption depends on investing all pre-tax earnings produced in the year of investment. Preliminary research suggests that U.S. equity-financed equipment purchases more likely than not offset after-tax capital rather than pre-tax earnings. See infra note 134 and accompanying text.

129. [Earnings (\$300)] – Loss Offset (\$0) x (1 – t) = \$300 x .5 = \$150. Economically, the taxpayer allocates \$150 of the earnings to tax and \$150 to purchase the asset. Tax free recovery of the capital invested in the asset takes places entirely during the holding period of the asset through economic cost recovery deductions.

130. [Earnings (\$300)] – Loss Offset (\$100) x (1 – t) = \$200 x .5 = \$100. Economically, the taxpayer allocates \$100 of the earnings to tax, \$100 of earnings to the investment, and keeps \$100 as an immediate return of the capital invested in the expensed asset.

formation threshold for a RBIT base, at or below which all investment is capital investment regardless of the cost recovery method employed. At or below this threshold, no pre-tax income can be offset under any RBIT base recovery method, including expensing, and only *capital* cost recovery methods can be analyzed.

Commentators have often noted a related but different phenomenon related to RBIT expensing. The maximum amount of overall possible investment in a RBIT base that allows full-offset expensing equals the maximum amount that can be invested in an AMIT base that uses economic depreciation divided by 1 – t, where t equals the tax rate. In the above example, $150 is the maximum amount of investment that is possible in an AMIT base beginning with $300 of earnings, because an AMIT base *must* tax invested earnings and *must* use economic depreciation. If the capital investment condition that this article uses is relaxed, however, and pre-tax earnings are allowed to be invested with full loss offset, the maximum amount of investment that is possible from $300 of earnings in a RBIT base that allows expensing becomes $300, or $150/1– t where t equals 50%.

The difference between the traditional analysis and the analysis undertaken in this article is that this article focuses exclusively on the *maximum* amount of *capital investment* that is possible within a RBIT base under any cost recovery method, while the traditional analysis focuses exclusively on the *maximum* amount of *pre-tax dollar investment* that is possible in a RBIT base under various cost recovery methods.[131]

Three other points should be noted here. First, the natural capital formation threshold for a RBIT base increases in inverse relationship to the tax rate. For example, if earnings were $300 but the tax rate were 40%, I_{max} and Capital Investment$_{max}$ would increase to $112.50;[132] and if the tax rate were 20%, both thresholds would increase to $133.33.[133] Under current tax rates, therefore, the natural capital formation threshold ranges from approximately

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131. Neither analysis standing alone is sufficient to analyze a RBIT base universally. This article focuses on capital cost recovery in a RBIT base, which necessarily excludes pre-tax investment. The traditional analysis makes no distinction between pre-tax and after-tax investment in a RBIT base, but implicitly assumes that all investment is (or can be) pre-tax investment. When a RBIT base taxes earnings in a normative fashion and capital cost recovery is examined under circumstances where it cannot limit the normative operation of capital formation, insights into the normative capital cost recovery method for a RBIT base are much more likely to emerge. Once the normative treatment of capital cost recovery is understood, it is more likely that the normative treatment of non-capital cost recovery or capital formation *and* capital cost recovery can be re-examined fruitfully.

132. Proof: I_{max} = [Earnings ($300) – Investment ($112.50)] x (1 – t) = $187.50 x .6 = $112.50, which equals 37.5% of earnings.

133. Proof: I_{max} = [Earnings ($300) – Investment ($133.33)] x (1 – t) = $166.67 x .8 = $133.33, which equals 44.4% of earnings.

37% to 45% of net earnings (prior to any cost recovery deductions). Second, given that fairly high capital formation threshold, it is reasonable to assume that a substantial amount of capital-financed investment in short-lived depreciable assets takes place in the U.S. tax base.[134] Third, expensing of investment in excess of the minimum amount of capital that can be produced from current earnings under any cost recovery method raises a broad range of capital formation and cost recovery policy issues that are beyond the scope of this article.[135]

This article will continue to examine the comparative effects of RBIT base cost recovery methods on investments in short-lived self-exhausting assets, with the understanding that all of the investments analyzed hereafter consist of amounts that fall below the natural RBIT base capital formation threshold.

V. NORMATIVE CRITERION #1: RECOVERING THE FULL FINANCIAL COST OF INVESTMENT

A. *The Cary Brown Analysis*

Expensing as a theoretical yardstick of capital income taxation policy in the U.S. began with a now-famous 1948 comparative analysis of business asset income taxation by E. Cary Brown.[136] Brown's article analyzed the effect of income tax depreciation or cost recovery methods on the net cost of investment for the purpose of comparing the value of various recovery methods as investment incentives. He used a cost vs. benefit analysis that measured and ranked recovery methods by the excess of the present value of the cost of depreciable assets over the present value of the future receipts from those assets.

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134. See, e.g., Statistical Snapshot of the 1995 Construction Industry Annual Financial Survey, in Journal of Lending and Credit Risk Management 57, 59 (1996) (Survey respondents finance between 37% and 68% of equipment purchases from current cash flows.). It is difficult, however, to estimate what percentage the amounts U.S. corporations spend on equipment purchases is of corporate taxable income in order to determine how much equipment investment is financed from RBIT base tax capital. Note, however, that the total amount of cost recovery deductions taken by profitable U.S. corporations with taxable years ending between July 1997 and June 1998 ($413 billion) is less than the amount of "tax capital" available to those corporations based on an analysis of statistical information from their income tax returns and applying Formula 4 in the text ($658 billion). See IRS Pub. No. 1053, Income Tax Returns of Active Corporations with Accounting Periods Ended July 1977 through June 1998 in Corporation Source Book of Statistics of Income 245 (All Industries Returns with Net Income) (March 3, 2000). If one assumes that annual corporate expenditures for equipment do not exceed the annual amount of cost recovery deductions allowed for all assets, than equipment purchases must be supported by, if not financed from, capital.

135. See e.g., supra note 17 and accompanying text, and infra Part VIII.

136. See Brown, supra note 23.

Specifically, Brown analyzed and compared the net "after-tax" *cost* of investment (initial cost minus the present value of tax reduction due to depreciation deductions) with the present value of the net after-tax *yield* from that investment (pre-tax cash flow minus tax).

On one end of the spectrum of cost recovery methods, Brown concluded that economically depreciating the cost of an investment caused the net after-tax cost of making such an investment to exceed its net after-tax yield in present value terms. Table 11 below duplicates Brown's original example of economic depreciation.[137] In Table 11, G.I. represents gross income; Deprec represents depreciation; T.I. represents taxable income, ATCF represents after-tax cash flow; and PV represents present value.[138]

Table 11: Cary Brown Example Of Economic Depreciation

Year	G.I.	Deprec	T.I.	Tax	ATCF
1	100	80	20	10	90
2	100	80	20	10	90
3	100	80	20	10	90
4	100	80	20	10	90
5	100	80	20	10	90
TOT	500	400	100	50	450
PV	400	320	80	40	360

Brown used the following basic analysis: An asset that cost $400 produces a 5-year income stream of $500 at $100 annually. At a discount rate of 8%, the present value of the asset's pre-tax yield ($400) exactly equals its cost. Assuming a 50% tax is imposed, and economic depreciation of $80 per year is allowed in computing taxable income,[139] $10 per year of tax is paid (50%

137. Table 11 and Table 12 represent only the items and amounts employed in Brown's actual analysis and thus differ from the Tables used earlier in this article. See Brown, supra note 23, at 304.

138. Brown used only one discount rate in his analysis, which is treated as the equivalent of the pre-tax discount rate used in the other Tables used in this article. Brown justified this treatment by assuming that interest earnings were nontaxable and interest payments were nondeductible. Therefore, it cost the taxpayer no more to borrow after tax than before, and benefitted the taxpayer no more to lend after tax than before. This simplifying assumption eliminates the necessity to use different discount rates to measure the financial benefit or cost of tax or economic flows before and after tax. Id. at 303, n.4.

139. For a definition and example of economic depreciation, see discussion at supra notes 24-37 and accompanying text. For the present, it should be noted that the depreciation of a 5-year $100 annual income stream at $80 per year is not economic

of $20 taxable income) and the present value of the asset's net yield after-tax becomes $360 ($90 X 5 years discounted at 8%). Thus, the present value of the cost of the asset ($400) exceeds its net yield after tax by $40.

Alternatively, Brown explained this $40 difference by reducing the $400 cost of the asset by the present value of the tax savings generated by the depreciation deduction stream ($80 X 50% = $40 X 5 years discounted at 8% = $160), thus arriving at a net cost after tax of $240 ($400 - $160). This net cost after tax exceeded the net yield after tax, which he computed by discounting 50% of the pre-tax income stream at 8% ($100 X 50% = $50 X 5 years discounted at 8% = $200). Again the excess of net after-tax cost over net after-tax yield was $40.

On the other end of the spectrum of recovery methods, Brown concluded that immediately expensing the cost of the same investment "neutralized" the tax as an investment decision factor by making the present value of the net after-tax cost equal to the present value of the net after-tax yield.

Table 12 below demonstrates the application of expensing to the investment portrayed in Table 11. Year 0 represents Time 0, the moment at which the asset is acquired and its cost expensed. Time 0 is also the point from which net present value determinations are made in both Table 11 and 12.

Table 12: Cary Brown Example Of Expensing

Year	G.I.	Deprec	T.I.	Tax	ATCF
1	100	400	-400	-200	+200
2	100	0	100	50	50
3	100	0	100	50	50
4	100	0	100	50	50
5	100	0	100	50	50
TOT	500	400	100	50	450
NPV	400	400	0	0	400

Expensing the $400 pre-tax cost of the asset at Time 0 produces a $200 negative tax, which produces an after-tax cash flow of $200. During Years 2 through 5, the $100 annual yield is taxed at the rate of 50%, and $50 tax is paid annually. However, the net present values of taxable income and tax are zero, because the positive and negative present values of those items cancel each

depreciation, but straight line. The error is not fatal to an introduction to Brown's basic concept of expensing or to his analysis.

other out.[140] This happens because the PV of the depreciation column ($400) now equals the PV of the G.I. column. In addition, because the PV of Tax paid is 0, the PV of the ATCF equals the PV of the PTCF.

Using the method of analysis just applied to economic depreciation, the $400 cost of the asset minus the $400 present value of the expensing recovery deduction yields the same amount as the present net value of the taxable income stream ($0) less the present value of tax paid ($0). Under Brown's alternative analysis, the $400 cost of the asset reduced by the present value of the tax savings generated by the depreciation deduction stream ($400 X 50% = $200) equals $200, which is the same amount as the net yield after tax, computed by discounting 50% of the pre-tax income stream by 8% ($100 X 50% = $50 X 5 years discounted at 8% = $200).

As Brown explained, under expensing the present value of the cost of the asset after tax no longer exceeds the present value of its cash flow after tax. Instead, the net present value of the cost of the asset after-tax equals the net present value of the yield from the asset after tax, which restores the investment to the same financial value that it had before tax.[141] Thus, expensing, according to Brown's analysis, is the only cost recovery method that completely restores the full financial cost of a depreciable investment to the taxpayer.

In summary, the Cary Brown analysis focuses on the net financial cost of assets relative to their net financial return. It deals with the present values of cost and returns, and uses pre-tax present values exclusively.[142] It accurately predicts that any recovery method slower than expensing fails to reduce the cost of an investment proportionately to its yield in present value terms. Only if expensing as a recovery method is coupled with immediate full loss offsets,[143] can it reduce the cost of an investment in proportion to the tax in present value terms and therefore equalize the present values of the investment's after-tax cost and its after-tax yield.

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140. In each case, the negative present value of the Year 1 amount is exactly offset by an equal positive present value of the Year 2 through 5 amounts, although the nominal totals of the positive amounts for those years exceeds the initial nominal negative amount. For example, the -400 nominal taxable income in Year 0 is exactly offset by the 400 present value of the 500 of nominal positive taxable income in Years 1 through 5. This explains why the net present value of taxable income is zero.

141. Brown, supra note 23, at 309-310.

142. Theoretically, this may stem from Brown's decision to treat interest income as nontaxable and payment as nondeductible. See supra note 138. This convention may also be a sign of the undeveloped state of financial analysis of recovery methods at the time.

143. "Both types of adjustment are theoretically necessary, and they cannot be viewed as alternatives." Brown, supra note 136, at 310.

B. *A Modern Analysis of Net Financial Cost*

Modern comparative financial analysis focuses on the same issues but provides fuller insights than Brown's analysis. For example, the information provided earlier by Table 1 through Table 5 can be used to compute the "net financial tax cost" imposed on the break-even transactions therein under various cost recovery regimes within a RBIT base. In order to do this, the after-tax present value of the after-tax cash flow (PV_2 ATCF) is simply subtracted from the after-tax present value of the tax paid on the income produced by the transaction (PV_2 Tax). The resulting amount simply isolates the *net* after-tax present value of the transaction in question under various recovery methods, including expensing. Table 13 below correlates these recovery methods with their corresponding net financial tax cost.

Table 13: Net Financial Tax Cost Under Various Recovery Methods

Rcvry Meth	PV_2 Tax Paid	Net PV_2 ATCF	**Net Final Tax Cost**
1-Economic	11.86	0.00	**11.86**
2-ACRS	10.80	1.04	**9.76**
3-MACRS	10.46	1.41	**9.05**
4-End yr Exp	8.33	3.57	**4.76**
5-Theory Exp	5.93	5.93	**0.00**

The analysis in Table 13 is similar to the Cary Brown financial cost analysis, but it is more accurate because it uses after-tax discount rates in its computations. All of the investments break even financially before tax,[144] and even the slowest recovery method, economic depreciation, causes the transaction to break even financially after tax as well.[145] However, each of the accelerated recovery methods does better than break even financially after-tax as shown by the Net PV_2 ATCF column, which progresses from $0.00 to $5.93. As a result, the net financial tax cost is reduced from $11.86 to $0.00. Under expensing the net after-tax financial gain in the form of the PV_2 of the ATCF ($5.93) is enough to exactly offset the financial burden of the PV_2 of the Tax Paid ($5.93), creating a net financial tax cost of zero.

144. The Pre-tax Present Value (PV_1) of the Pre-tax Cash Flow in Table 1 through Table 5 is consistently $100.00, which equals the cost of the investment.

145. This is shown by the fact that the Net PV_2 of the ATCF under the economic cost recovery method in Table 13 equals $0.00. Also note that in Table 1, which portrays economic cost recovery, the slowest of the recovery methods, the PV_1 of the Pre-tax Cash Flow and the PV_2 of the After-tax Cash Flow both equal $100, which is the cost of the asset.

At this point, certain preliminary conclusions can be stated. If equal amounts of capital are invested, all recovery methods will produce the same amount of economic (or nominal) taxable income, tax paid, and after-tax cash flow.[146] Overall, none of them does any worse than break even, financially after tax. But only with theoretical expensing is the net financial return to the taxpayer after tax unreduced by the financial cost of the tax imposed on the transaction. In other words, in a state of financial equilibrium, only with expensing does the financial return to capital provided by the federal government's cost recovery system "pay for" the financial cost of the tax imposed on depreciable asset investments by that same government. Thus, only under expensing is the full financial value of invested capital returned to investing taxpayers after tax; and only capital expensing satisfies the first criterion for a normative capital cost recovery method in a realization-based income tax.

VI. Normative Criterion #2: Appropriately Measuring Net Realized Income

The analysis in Part V only required a comparative analysis of cost recovery methods within a RBIT base. Determining whether any cost recovery method satisfies the second criterion for a normative RBIT base recovery method requires a broader analysis than that used with respect to the first criterion for the following reasons. On the transactional accounting level, economic cost recovery in a RBIT base is technically identical to economic depreciation in an AMIT base, and cash flow accounting in a CFIT base is technically identical to expensing in a RBIT base. Therefore, in order to fully understand how those recovery methods relate to the structural and accounting principles of a RBIT base, Part VI of this article must distinguish those principles from those employed in AMIT and CFIT bases. This Part first examines the structural and accounting principles of an AMIT base as they relate to the taxation of short-lived fully depreciable assets, and then examines CFIT base principles as they relate to taxation of the same type of assets. In the last section of this Part, the article reexamines RBIT base recovery methods using a deeper analysis of the structural and accounting principles of a RBIT base. This Part concludes that capital expensing is the only capital cost recovery method that measures net realized income financially in a manner entirely consistent with RBIT base structural and accounting principles.

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146. In Table 1 through Table 5, all of which portray $100.00 investments in depreciable assets, Total Gross Income, Taxable Income, Tax Paid, and After-tax Cash Flow are consistently $126.20, $26.20, $13.10, and $113.10, respectively. As discussed in Part IV. above, this article's analysis is limited to economic situations where true capital is invested.

A. *Measuring Net Economic Income in an AMIT Base*

1. *Introduction.*—Table 14 below contains the essential financial information needed to evaluate the normative method of measuring income from depreciable assets in an AMIT base. This Table combines a summary of the relevant information from the investment in Table 1 during Years 1– 4 with the tax and economic effects of making that investment at Time 0. The purpose of this Table is to examine the net economic and financial consequences of a combined investment and investment yield transaction in an AMIT base.

Table 14: Net Financial Characteristics of $100 Investment Subject to Economic Depreciation[147]

	G.I.	- Deprec	= T.I.	PTCF	- Tax	= ATCF	ETR
Time 0				-100.00		-100.00	
+TOT Yrs 1-4	126.10	100.00	26.20	126.20	13.10	113.10	
=Net TOT Yrs 0-4	126.10	100.00	26.20	26.20	13.10	13.10	
NPV_1 @ 10%	100.00	78.35	21.65	**0.00**	**10.82**	**-10.82**	
NPV_2 @ 5%	111.86	88.14	23.73	**11.86**	**11.86**	**0.00**	**100%**
IRR				10.00%		5.00%	**50%**

As stated earlier, the central structural approach of an AMIT base with respect to the taxation of capital income is to tax *both* invested earnings *and* the net investment yield produced by invested earnings. The central accounting focus of an AMIT base is on periodic net wealth valuation, which translates into net asset valuation in the context of investments in individual income-producing depreciable assets. Economic depreciation implements that periodic valuation process appropriately for an AMIT base. For example, Table 14 depicts the following sequence of events: First, $100 of wealth in the form of cash is converted into the same amount of wealth in the form of a depreciable asset. Second, that asset produces a pre-tax yield with a pre-tax present value of $100. This fact is proven by the $100 PV_1 of the asset's PTCF at the time it is acquired. This gives the investment a pre-tax net present value (NPV_1) of

147. This Table allows us to compute the net nominal, net pre-tax present value, and net after-tax present value of the following amounts for Time 0 through Year 4: (1) the Gross Income and/or Gross Receipts stream; (2) The economic depreciation deduction stream; (3) Taxable Income; (4) the PTCF; (5) the Tax Paid; and (6) the ATCF. In addition, this Table provides the IRR and NPV Effective Tax Rates. The first three columns represent the tax accounting for these investments (G.I. – Recovery = T.I.), and the last three columns represent the economic accounting (PTCF – Tax = ATCF). This Table also shows the effective tax rate based on net present value (100%) and the effective tax rate based on internal rule of return (50%).

\$0.00.[148] Third, by the end of the investment's useful life, the asset will be worthless, but the taxpayer will have converted the asset back into cash with an after-tax present value of \$100, as measured at the time of the asset's acquisition. Overall, the entire transaction, as measured at the time of the asset's acquisition, consists of converting \$100 of after-tax earnings into an asset with a value of \$100 and thence into \$100 of after-tax investment yield, which gives the entire three-step transaction a net present value of zero – both before and after tax.

The net present value of the investment in Table 14 before tax is zero because the initial value of the investment is the present value of the asset's future pre-tax cash flow; and here, the asset's yield rate (Y) equals the pre-tax discount rate (D_1) that is used to measure the financial value of the yield stream before tax. Both rates are 10% in the financial break-even model used in this article. Economic depreciation uniquely insures that the net present value of the taxpayer's investment *after-tax* also equals zero. This is appropriate for a break-even investment in an AMIT base, because it equates the after-tax financial value of the investment to its pre-tax financial value. The use of any other depreciation method would be inappropriate in an AMIT base because, as Table 8 showed, those methods would increase the net present value of the asset after tax above zero, thus destroying the pre-tax/after-tax valuation equality.

Table 14 also allows us to reference the following four characteristics that are often attributed to economic depreciation.[149] First, the nominal sum of the depreciation deductions equals the amount invested (\$100). Second, if reinvested constantly, it would maintain the value of the asset. If, for example, each year's depreciation deduction were invested at Time 0 and allowed to grow at the after-tax discount rate until the year the deduction took place, the sum of the present values of the amounts on hand at each of the taxable periods would equal the amount invested.[150] Third, it is measured by the change in the present value of the asset. This was previously explained in the introduction to Table 1, and means simply that economic depreciation is the reduction in the present value of an asset between the beginning and end of a taxable period as measured by the decrease in the yield stream's present value using the yield rate as the discount rate for that purpose.[151] Fourth, it preserves an invariant relationship

148. See the NPV_1 of the PTCF, which equals \$0.00.

149. The following summary is taken from Jane G. Gravelle, Tax Neutrality and Capital Cost Recovery in The Economic Effects Of Taxing Capital Income 101-02 (1994).

150. For example, the cumulative present value of investing the economic recovery deductions from Table 1 at 10% compounded annually would be the following amount: \$21.55 x $(1.10)^4$ plus \$23.70 x $(1.10)^3$ plus \$26.07 x $(1.10)^2$ plus \$28.68 x 1.10 = \$31.55 + \$31.55 + \$31.55 + \$31.55 = \$126.20. As Table 1 shows, the after-tax present value of that income stream is \$100, the original amount invested.

151. See supra note 27. This important point is not clear from an examination of break-even investments in which the yield and pre-tax discount rates are the same; but the rule is used in computing economic depreciation throughout this article to

between pre-tax and after-tax rates of return in exact proportion to the nominal tax rate.[152] As a result, the IRR ETR always equals the nominal tax rate.

2. *Internal Rate of Return, Net Present Value and Effective Tax Rates.*—IRR analysis reveals the key role that economic depreciation plays in producing the financial parameters of a break-even investment in an AMIT base. For example, the IRR of the Gross Receipts and PTCF streams in Table 14 is 10%, while the IRR of the economic depreciation deduction stream is 0%.[153] Since Taxable Income is computed as Gross Receipts minus Depreciation, the net pre-tax IRR (IRR_1) is 10% minus 0%. Appropriately, the IRR of the ATCF stream (IRR_2) is 5%, which equals IRR_1 x (1 - t). As a result, the IRR ETR (50%) shows that the *rate* of return on investment is reduced exactly in proportion to the nominal tax rate.

Net present value (NPV) analysis also allows us to make significant observations about the role economic depreciation plays in AMIT base accounting. First, notice in Table 14 that the NPV_1 of Taxable Income ($21.65) equals the difference between the NPV_1 of the G.I. and PTCF streams ($100) and the PV_1 of the economic depreciation deduction stream ($78.35). Similarly, the NPV_2 of Taxable Income ($23.73) equals the difference between the NPV_2 of the G.I. and PTCF streams ($100) and the PV_2 of the economic depreciation deduction stream ($88.14). This shows that financial Taxable Income, as measured by NPV, is computed in the same manner as nominal Taxable Income.

Second, the net financial value of the after-tax cash flow equals zero because the financial value of economic depreciation produces exactly the financial value of taxable income necessary to produce that zero net present value. In Table 14, for example, the NPV_2 of the PTCF ($11.86) equals the NPV_2 of the tax paid on the transaction. This shows that the financial return from the investment measured by the after-tax discount rate is used exclusively to pay the tax due on the transaction. As a result, none of the after-tax present value of the transaction inures to the benefit of the taxpayer, and the NPV_2 of the ATCF is zero. This also produces a 100% NPV effective tax rate.[154]

Economic depreciation causes the entire after-tax financial return from a break-even financial investment to be paid as tax and therefore provides no net financial benefit to the taxpayer/investor after tax. This is appropriate in a

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produce economic depreciation or cost recovery models which consistently satisfy the other three principles. See also, Chirelstein, supra note 26; Samuelsen, supra note 25; Figure 6 and accompanying text in infra Part VI.C.1.

152. Pre-tax rate of return equals the yield rate. After-tax rate of return equals the yield rate x (1 – the tax rate) or Y x (1 – t).

153. This IRR can be computed by positing a $100 deposit that produces an income stream identical to the economic depreciation deduction stream for a $100 investment.

154. See discussion at supra Part II.F.

tax system that taxes and measures only net change in pre-tax asset values because no change in pre-tax asset value occurs when this type of break-even investment takes place. Although economic depreciation does not cause the present value of the taxpayer's depreciation *deductions* to equal the amount invested, it does cause the present value of the taxpayer's *after-tax cash flow* to equal the amount invested. Therefore the transaction has a zero net present value to an AMIT base taxpayer both before and after tax.

The combined IRR and NPV analyses show that economic depreciation, in addition to providing appropriate *rates* of return, as measured by IRR, also produces appropriate financial *values* for financial break-even investments in depreciable assets in an AMIT base, as measured by NPV.

3. *Hurdle Rates and the Effect of Increased Yield Rates on IRR ETR and NPV ETR.*—Investments rarely occur in the real world unless their projected net present value exceeds their cost. Such a situation only exists where an asset's projected yield rate exceeds a baseline discount rate used by the relevant financial decision makers.[155] This article calls the rate of return that an investment must earn in order to produce a positive net present value a "hurdle rate."[156] In a no-tax world, the hurdle rate would simply be the baseline discount rate. For example, the $100 investment model we have used so far would have a hurdle rate of 10% because the pre-tax (or no-tax) discount rate is set at 10%. Like NPV ETR and IRR ETR, financial hurdle rates provide a useful tool for analyzing the financial characteristics of the tax accounting treatment of depreciable assets in various tax bases. In a no-tax environment, the financial hurdle rate is the same as the baseline discount rate.[157] In the context of our investment model, the tax base under all three systems is or begins with the investment's pre-tax cash flow. Therefore, the pre-tax hurdle rate for all investments based on this model should be the same as the pre-tax discount rate. Indeed, in all of the RBIT, AMIT and CFIT base investments analyzed in this article so far, the pre-tax discount rate has been the hurdle rate for investments in depreciable assets before tax, because the yield rate must exceed D_1 for the investment to have a positive NPV *before tax*.[158]

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155. E.g., Summers, Investment Incentives and the Discounting of Depreciation Allowances (Nat'l Bureau of Econ. Research, Working Paper No. 1941, 1986) (Empirical survey of 200 major corporations suggests that most companies use high discount rates for prospective depreciation allowances, calling into question assumptions about cost recovery design, and suggesting that incentives providing immediate reduction in tax liabilities are more useful than multi-period incentives.).

156. The hurdle rate analysis in this article borrows generally from Knoll, supra note 94, at 1803-05.

157. In our investment model, this discount rate is presumed to be 10%.

158. This is shown by the fact that the PV_1 of the PTCF is always zero if D_1 equals 10% and the yield equals 10%. See supra Table 1 through Table 5.

The *after-tax* cash flow for all of these investments has two relevant present values. The pre-tax present value of the after-tax cash flow (PV_1 ATCF) measures the present value of the investment after-tax using the pre-tax discount rate. Similarly, the after-tax present value of the after-tax cash flow (PV_2 ATCF) measures the present value of the investment after tax using the after-tax discount rate. Under perfect financial circumstances, the after-tax discount rate equals the pre-tax discount rate times one minus the tax rate. In other words, $D_2 = D_1 \times (1 - t)$. In a taxed environment, only the after-tax cash flow has practical financial significance for tax-paying investors. Therefore, the relevant "pre-tax hurdle rate" *for a taxpayer* is the rate that first creates an after-tax cash flow with a positive present value using the pre-tax discount rate (PV_1 ATCF ≥ 0). This hurdle rate will be called H_1. The relevant "after-tax hurdle rate" *for a taxpayer* is the rate that first creates an after-tax cash flow with a positive present value after tax using the after-tax discount rate (PV_2 ATCF ≥ 0.). This hurdle rate will be called H_2.

Comparing investments at and above the taxpayer after-tax hurdle rate (H_2) allows us to determine how persistent are the financial characteristics of economic depreciation at increasing yield rates. Such a comparative analysis also allows us to better understand the dynamics of AMIT base taxation and economic depreciation. For example, Table 14 shows that the after-tax hurdle rate for a break-even investment in an economically depreciated asset in an AMIT base is the pre-tax discount rate (D_1), so that $H_2 = D_1$.[159]

Table 15 below shows the financial changes that occur to a depreciable asset investment transaction as the yield rate increases from 10% to 20%. By focusing on the financial changes that occur as a result of this yield increase, this Table allows us to better understand the financial operation and impact of economic depreciation. Table 15 contains most of the same information contained in Table 14 but for two different yield rates: 10% (the after-tax hurdle rate) and 20%, or twice that yield.[160] Again, the tax accounting is represented by the columns GR – Depreciation = Taxable Income, while the cash flow accounting is represented by the columns PTCF – Tax = ATCF.

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159. In Table 14, the NPV_2 of the ATCF is zero when the yield rate equals D_1. The yield rate must be greater than 10% in order for the NPV_2 ATCF to have a positive net present value. Thus the yield rate must exceed D_1 to produce a positive NPV_2 ATCF. The after-tax hurdle rate, therefore, is D_1. In an AMIT base, the after-tax hurdle rate actually equals the after-tax discount rate divided by 1 minus the tax rate. ($H_2 = D_2/1\text{-}t$). This formula equals the pre-tax discount rate. Thus where D_2 equals 5%, the after-tax hurdle rate is .05/1-.5 or .05/.5, which equals 10%, the pre-tax discount rate. Given an after-tax discount rate of 5%, therefore, an economically depreciated asset subject to a 50% tax rate must earn more than 10% (the pre-tax discount rate) before tax in order to produce a positive net present value after tax.

160. Twenty percent actually represents H_1, the rate at which the taxpayer's ATCF has a net present value of zero using the pre-tax discount rate. Just as $H_2 = D_{2/1-t}$, $H1 = D_1/1 - t$.

Table 15: Net Changes to Financial Characteristics of $100 Investment Subject to Economic Depreciation at Various Yield Rates[161]

Yield Rate/Net Change	GR/PTCF	Deprec	T.I.	Tax	ATCF	IRR ETR	NPV ETR
10% Yield PV_2/ NPV_2	111.86	88.14	23.72	11.86	0.00	**50%**	**100%**
20% Yield PV_2/NPV_2	136.98	87.67	49.31	24.65	12.33	**50%**	**67%**
Net Change PV_2/NPV_2	**+25.612**	**- .47**	**25.59**	**+12.79**	**+12.33**	**0%**	**-33%**

Although the Yield rate in Table 15 increases to 20%, the IRR ETR remains at 50%, because IRR_1 is the same as the Yield rate (20%) and IRR_2 equals Y x (1 – t) or 10%. This is the fourth traditional financial characteristic of economic depreciation described above, above, and probably its most recognized.[162] However, the NPV_2 of the ATCF is now positive ($12.33) instead of $0.00 because the Yield rate of 20% now greatly exceeds the after-tax hurdle rate of 10%. In addition, while the IRR ETR remains constant at 50%, the NPV ETR decreases from 100% at the after-tax hurdle rate (10% Yield) to only 67% as the yield rate increases to 20%.[163]

While Table 15 shows that the investment produces an NPV ETR of only 67% at the increased yield rate,[164] it fails to show that the NPV ETR on the *increased portion* of the yield is only 50.9%. The following Table completes the analysis by showing only the increases to and the changed ratios of the PV_2's of Tax Paid and After-tax Cash Flow at Yields of 10% and 20%, respectively. The result is a decrease in the overall NPV ETR.

161. The first row shows the Pv_2 or NPv_2 of each tax and financial accounting element of an economically depreciated investment with a 10% yield. Cf., Table 1 and Table 14. The second row shows the same information for an investment with a 20% yield. The third row shows the change between the two.

162. See supra notes 149-52 and accompanying text.

163. At 10% yield, NPV ETR = 100% because PV_2 Tax/PV_2 PTCF = 1 (11.86/11.86). At 20% yield, NPV ETR = 67% because PV_2 Tax /PV_2 PTCF = .67 (24.65/36.98).

164. NPV_2 Tax/NPV_2 Tax + NPV_2 ATCF = $24.65/$36.98 = 67%. NPV_2 Tax + NPV_2 ATCF also = NPV_2 PTCF.

Table 16: Changes in the Allocation of the Elements of NPV ETR due to Yield Rate Increase

Yield rate:	10%	Change	20%
NPV_2 Tax	11.86	+12.79	24.65
NPV_2 ATCF	0.00	+12.33	12.33
Tot NPV_2's	11.86	+25.12	36.98
NPV ETR	100%	50.9%	67%

These changes in NPV and NPV ETR show that once the after-tax hurdle rate is exceeded, *the NPV ETR with respect to the financial return in excess of the after-tax hurdle rate becomes approximately equal to the nominal tax rate.* To illustrate this point, notice that the NPV ETR on the first 10% of the 20% yield in Table 16 is 100%. This occurs because the entire NPV_2 of the PTCF is paid as tax.[165] However, as Table 16 also shows, the NPV ETR for the next 10% of yield is almost exactly identical to the nominal tax rate (50.9%).[166] Thus economic depreciation produces approximately a 50% NPV ETR on the portion of the yield *between* 10% and 20%,[167] and the overall NPV ETR on the 20% yield is a blended rate of 67%.

Two points emerge from this analysis. First, to the extent the financial yield produced by an economically depreciated asset in an AMIT base equals the pre-tax discount rate,[168] all financial yield is allocated exclusively to tax payment, as measured by NPV ETR. Second, the financial yield in excess of the after-tax hurdle rate is taxed financially at approximately the nominal tax rate, also as measured by the NPV ETR.

What is the reason for the exclusive allocation of the first 10% of the after-tax financial yield to the payment of tax? In the context of this investment model, an AMIT base only measures and taxes changes in pre-tax financial wealth, and no such increase exists as long as the yield rate of an investment is equal to or less than the pre-tax discount rate. However, once the yield rate exceeds the pre-tax discount rate (the taxpayer after-tax hurdle rate), an economically depreciated asset produces both a positive pre-tax change in wealth to tax and a positive net present value after-tax.

However, because the first level of the financial yield (to the extent of D_1) is taxed at a 100% effective rate, the NPV ETR for an economically depreciated asset in an AMIT base *never* exactly equals the applicable nominal tax rate, even though Yield in excess of D_1 is taxed almost at nominal rates

165. See supra Table 14.

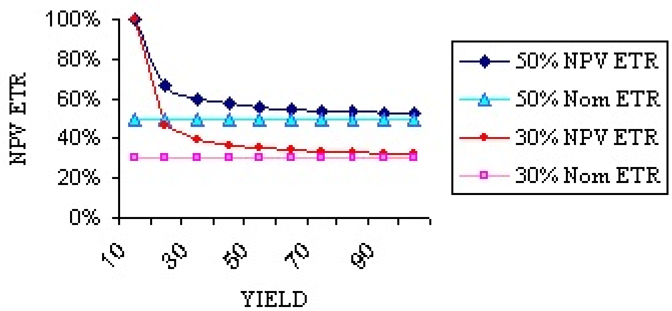
166. The minor difference is caused by the allocation of the PV_2 of the decrease in depreciation to the PV_2 T.I. but not to the PV_2 PTCF.

167. NPV_2 Tax Increase/NPV_2 Tot NPV_2's Increase = \$12.79/\$25.12 = 50.9%.

168. The pre-tax discount rate equals an AMIT taxpayer's after-tax hurdle rate.

financially. To confirm this point, Figure 1 below plots the NPV ETR for an economically depreciated $100 investment that is subject to a 50% tax rate and that produces a yield rate ranging from 10% to 90%. Nominal ETR's are also plotted for those tax rates to serve as a reference point.

Figure 1: NPV ETR at Variable Yield Rates



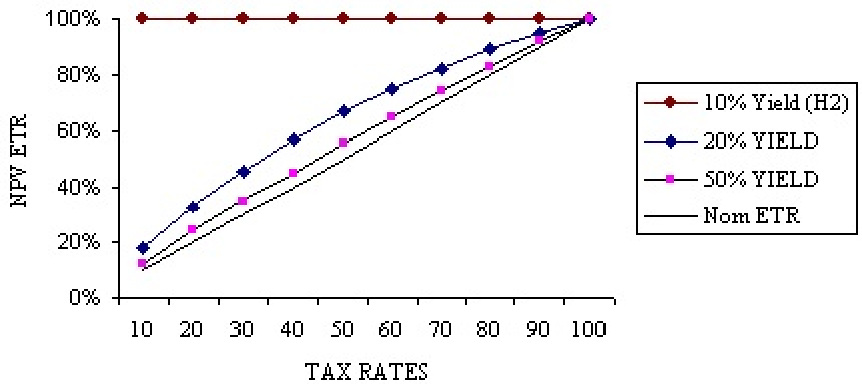
As shown earlier, at a 20% yield the first 10% of yield is taxed at an NPV effective rate of 100%, and the second 10% at 50.9%, producing an overall NPV ETR of 67%. As the amount of yield in excess of the after-tax hurdle rate increases, the overall effective tax rate decreases as more and more yield (and a greater percentage of yield) becomes subject to an effective tax rate of approximately 50%. Even at a Yield Rate of 90%, however, some of the original distortion created by taxing D_1 (the first 10% of yield) at 100% remains. At that tax rate, the NPV ETR for a $100 investment subject to a 50% tax rate and utilizing economic depreciation is 53%. Figure 1 shows that the same failure to reach nominal effective rates applies to an economically depreciated asset that is subject to a 30% tax rate, so this financial behavior is not dependent upon the nominal tax-rate.

In addition to illustrating the dynamics of AMIT base income measurement, the above analysis strongly suggests two broader conclusions: first, NPV is an appropriate measure of effective tax rates in an AMIT base; and second, the normative taxation of depreciable asset income in an AMIT base includes both the complete confiscation as tax of any financial yield up to the pre-tax discount rate, and the approximately proportionate taxation of the financial yield in excess of that rate.

4. *The Effect of Variable Tax Rates on NPV ETR.*—The after-tax present value of economically depreciated assets varies with the nominal tax rate for all yield rates except the after-tax hurdle rate (H_2). At that rate, the NPV_2 of economically depreciated assets at all tax rates is zero. As the first line

in Figure 2 below also shows, this causes the NPV effective tax rate for break-even investments to equal 100% regardless of the nominal tax rate.

Figure 2: NPV ETR at Variable Tax Rates



At all yield rates above H_2, however, after-tax NPV and NPV ETR vary with the tax rate. As Figure 2 shows, NPV ETR always exceeds the nominal ETR, with the excess being greater for low yield assets than for high yield assets. This occurs because the effect of taxing the first portion of the yield (up to D_1) at 100% and yield in excess of that rate at near nominal effective tax rates becomes attenuated at increased yield rates. The "bow" in the trend lines for a given tax rate result from the interplay between the after-tax discount rates for a given tax rate and the tax rate itself.[169] Overall, Figure 2 simply shows another aspect of the phenomenon illustrated in Figure 1.

5. *Summary.*—In summary, economic depreciation always allocates the before and after-tax IRR's of depreciable asset investments in proportion to the nominal tax rate. This is normative treatment for an AMIT base, which measures value decay through the use of economic depreciation. Since, in a sinking fund model, value is measured by the present value of future pre-tax and after-tax cash flows, IRR ETR's that correspond to nominal tax rates are evidence that economic depreciation causes normative taxation in an accretion-measured income tax.

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169. As the tax rate, t, increases, the after-tax discount rate, D_2, decreases, and the NPV_2 of the PTCF increases. On the other hand, the NPV_2 Tax increases both because t increases and because D_2 decreases. At low tax rates, the NPV_2 increase is due mostly to changes in D_2, while at high tax rates the NPV_2 tax increase is due mostly to changes in t. The "bow" in the plot of NPV ETR for economic depreciation occurs where the impact of the decreases in D_2 and the increase in t combine for the most effect.

To the extent that yield rates exceed the pre-tax discount rate (and after-tax hurdle rate), economic depreciation causes a similar allocation of the NPV_2 of those same investments based on NPV effective tax rates. As the above discussion shows, however, economic depreciation never completely succeeds in allocating the after-tax net present value of investments in proportion to nominal tax rates, regardless of the yield or tax rate. This appears to be a necessary by-product of the role of economic depreciation in measuring income defined as changes in net financial value, because financial value is measured against the benchmark of the pre-tax discount rate. Despite this anomaly, economic depreciation overall is an appropriate means of measuring income in the form of net accretions in financial value in an AMIT base. Whether this is also the normative way to measure income in a RBIT base remains to be seen.[170]

B. *Cash Flow Accounting in a CFIT Base*

1. *Introduction.*—Structurally, a CFIT does not tax invested earnings but does tax investment yield unless that yield is reinvested. The formula for this version of a consumption tax is essentially Earnings – Investment. Cash flow accounting is the central means of effectuating these structural principles in the context of investment in short-lived tangible assets. In the context of this article's common investment model, as shown in Table 17 below,[171] a $100 investment at Time 0 in a CFIT base produces a tax base reduction of $100. Because this is a break-even investment, the yield rate of the investment equals the pre-tax discount rate. Therefore, the PV_1 of the investment's pre-tax cash flow, which is treated as an increase in the tax base, also equals $100. As a result, the pre-tax present values of the sequential tax base reduction and tax base increase offset each other exactly. And, because Taxable Income is a perfect reflection of the investment and yield cash flows, its pre-tax net present value is $0.00. Consequently, the pre-tax present values of Tax Paid and the taxpayer's After-Tax Cash flow are also $0.00.

170. See discussion in infra Part VI.C.

171. This Table contains the same informational elements as Table 14 (Economic Depreciation in an AMIT Base), except that no cost recovery deductions are employed so Taxable Income equals the PTCF. The balance of the information is derived from Table 5, supra, which contains a detailed analysis of theoretical instantaneous expensing. The result is a technically identical stand-in for cash flow accounting and the normative taxation of capital income from short-lived completely wasting assets in a pure CFIT base.

Table 17: Financial Characteristics of $100 Investment Subject to Expensing in a CFIT Base

	PTCF	T.I.	Tax	ATCF	ETR
Time 0	-100.00	-100.00	-50.00	-50.00	
TOT Yrs 1-4	126.20	126.20	63.10	63.10	
Net Yrs 0 – 4	26.20	26.20	13.10	13.10	
NPV_1 @ 10%	0.00	**0.00**	**0.00**	**0.00**	
NPV_2 @ 5%	11.86	**11.86**	**5.93**	**5.93**	**50%**
IRR	10.00%			10.00%	0%

Notwithstanding this exact pre-tax financial offset, in contrast to an AMIT base the PV_2 of the taxpayer's ATCF in a CFIT base is a positive amount, $5.93. Here is how that amount is derived. Initially, the after-tax net present value of the pre-tax cash flow (NPV_2 PTCF) is $11.86. This is the excess of the present value of the yield stream (111.86) over the amount invested ($100) using the after-tax discount rate (5%). This suggests that the taxpayer's after-tax return on the pre-tax cash flow is financially correct because it equals the pre-tax return times 1 minus the tax rate (10% x [1-.5]). Indeed, this financial amount is produced by all of the $100 financial break-even investments in this article, regardless of the tax base or cost recovery method employed, because if is a characteristic of the pre-tax cash flow in the financial break-even model used in this article.

Uniquely though, cash flow accounting produces a tax treatment of both investment and investment yield that is completely proportional to the tax rate both economically and financially. Commentators often use a co-investment theoretical model to explain the dynamics of a CFIT base that produces such results. Under this model, because a $100 investment in a CFIT base is made with pre-tax dollars, it theoretically becomes a co-investment of the taxpayer and the government based on the ratio of the tax rate. The taxpayer's portion of the investment comes from the amount of the initial Investment times 1 minus the tax rate (I x [1 – t]). Similarly, the taxpayer's portion of the investment yield becomes (I x y) times (1 minus the tax rate) or ([I x y] x [1 – t]). Therefore, the taxpayer's portion of both investment and investment yield equals 50% (1 – t), and this ratio persists throughout the nominal and financial results in terms of both pre-tax and after-tax net present values. Thus, the after-tax net present value of the after-tax cash flow (NPV_2 ATCF) is $5.93, or 50% of the NPV_2 of the pre-tax cash flow (NPV_2 PTCF), which is $11.86.

From the government's standpoint, the $50 tax savings produced by expensing (Investment x t) can be viewed as a co-investment in the asset by the government in the form of foregone tax revenue. This hypothetical co-investment yields the same type of nominal and financial return as the taxpayer's after-tax investment. Since the government's portion of the financial results comes from the amount of the initial investment times the tax rate (I x t), the government's portion of the investment yield is equal to (I x y) x t, or PTCF x t.

In a state of financial equilibrium, where the yield rate equals the pre-tax discount rate, both parties' investment and yield equations offset each other in pre-tax present value terms. So, for example, the taxpayer essentially invests $100 before tax and earns a 10% return on that investment, which gives the investment a NPV of zero using the pre-tax discount rate of 10%. But, the taxpayer only invests $50 *after* tax, and earns a 10% return on that amount, which has a NPV of $5.93 using the after-tax discount rate of 5%, or Y x (1 – t). In other words, the formula for the pre-tax equilibrium is:

Invest = Invest x Y

While the formula for the after-tax equilibrium is:

Invest x (1 – t) = [Invest x (1 – t)] x Y(1 – t)

The two formulas are identical if the factor (1 - t) is factored out of the second formula. This interpretation is supported by the fact that both the PTCF and the ATCF have an IRR of 10%.[172] In a financial sense, CFIT base accounting reflects parallel but identical pre-tax and after-tax dynamics that are related by the difference between the yield rate and the yield rate times one minus t (Y x [1 – t]).

2. *CFIT Accounting: Financial Accuracy and Proportionality.*—Because CFIT base structural and accounting principles ignore asset value and do not require keeping an investment cost account such as basis in order to recover capital tax-free, the entire tax accounting consists of a cash flow accounting. As a result, the tax consequences of CFIT base investments mirror the financial consequences of those investments. For example, Table 17 above shows that the taxpayer pre-tax hurdle rate (H_1) in a CFIT base equals the pre-tax discount rate (D_1) because the NPV_1 of the ATCF

172. These facts are also the basis for the frequently stated assertions that expensing causes a RBIT base to emulate a CFIT base and exempts the income produced by expensed assets from taxation, both in nominal and financial terms. The nominal (or economic) exemption stems from the fact that the return on after-tax investment of $50, both in economic and financial terms, is 10% compounded over 4 years, despite a 50% tax rate. See discussion supra note 128 and accompanying text. The financial exemption stems from the fact that the pre-tax and after-tax IRR's are identical – 10%.

in that Table equals zero. The equivalence of H_1 and D_1 suggests that the after-tax hurdle rate (H_2) should equal the after-tax discount rate (D_2), or D_1 x 1 – t.

As Table 18 below shows, this is true in the context of the investment model where the tax rate is 50%, because when the yield rate is reduced to 5% (D_2), the NPV_2 of the ATCF does indeed become $0.00.[173] Because both hurdle rates coincide with the relevant discount rate (pre-tax and after-tax), CFIT base taxable income coincides exactly with financial income, and the financial characteristics of investments after-tax coincide with the financial characteristics of those investments before tax.

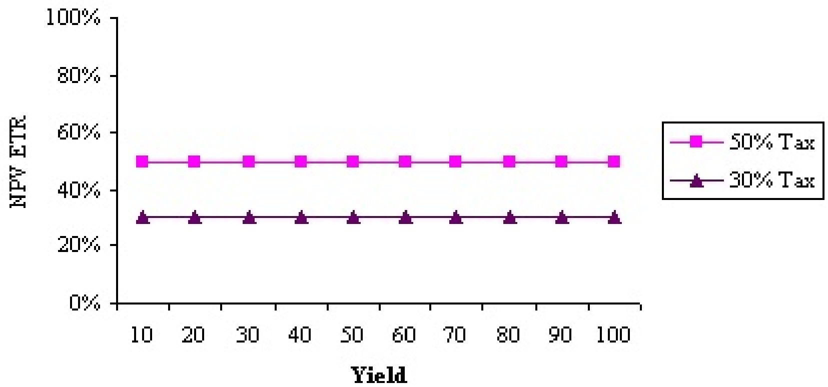
Table 18: $100 Investment Subject to Expensing in a CFIT Base at After-tax Hurdle Rate (5%)

	PTCF	T.I.	Tax	ATCF	ETR
Time 0	-100.00	-100.00	-50.00	-50.00	
TOT Yrs 1-4	112.80	112.80	56.40	56.40	
Net Yrs 0 – 4	12.80	12.80	6.40	6.40	
NPV_1 @ 10%	- 10.61	89.39	-5.30	-5.30	
NPV_2 @ 5%	**0.00**	**0.00**	**0.00**	**0.00**	**0%**
IRR	5.00%			5.00%	0%

The perfect proportionality of CFIT base accounting also suggests that NPV Effective Tax Rates should coincide with nominal tax rates at tax rates other than 50% or at yield rates greater than the pre-tax hurdle rate. Figure 3 below confirms the first point, and Figure 4 below confirms the second.

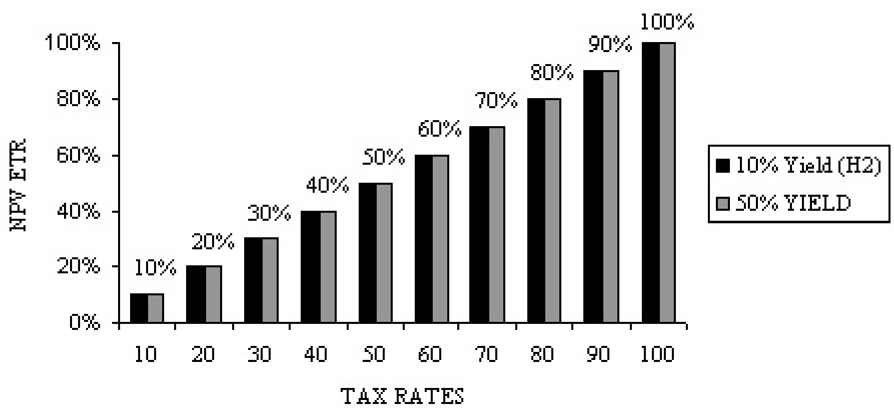
173. At yield rates below the after-tax discount rate, the after-tax present value of the PTCF (and T.I.) becomes a negative amount. That negative amount is also allocated between Tax Paid and ATCF in the ratio of the tax rate.

Figure 3: NPV ETR at Various Yield Rates



As Figure 3 shows, the Effective Tax Rate based on Net Present Value (NPV ETR) *always* equals the nominal tax rate, regardless of the yield rate produced by a short-lived "depreciable" asset. This occurs because both nominal and financial ETR's are proportional to the nominal tax rate in a CFIT base.

Figure 4: NPV ETR at Variable Tax Rates



As Figure 4 shows, exact proportionality also persists throughout the range of tax rates. In Figure 4, the NPV ETR for two investments with widely variant yields (10% and 50%) coincide exactly with the nominal tax rate, no matter what that tax rate is. As a result, neither variance in yield rates nor tax rates distorts the NPV ETR. This is in marked contrast to the performance of an

AMIT base, where the hurdle rate varies widely with the tax rate,[174] and where only yield rates in excess of the after-tax hurdle rate are taxed even approximately at the nominal statutory rates financially. CFIT base cash flow accounting creates a wonderfully neutral and *direct* capital income taxation regime which contrasts sharply with the *indirect* measurement and taxation of capital income that is based on and measured by changes in net asset value under an AMIT base. CFIT base accounting is not structurally appropriate for an AMIT base because it ignores both asset value and changes in that value, but it clearly measures the cash flow "income" produced by short-lived depreciable assets accurately financially.

C. *Measuring Net Realized Income in a RBIT Base*

This section of Part VI will apply the tools of IRR ETR, NPV ETR, and hurdle rate analysis to this article's investment model using various RBIT base capital cost recovery methods. This analysis will measure the financial information provided by each of these tools against the normative structural and accounting principles of a RBIT base. The goal will be to identify the capital cost recovery method that best accommodates those structural and accounting principles based on these comparative analyses, both individually and collectively.

1. *IRR Effective Tax Rates.*—This section first compares the impact of various capital cost recovery methods on the IRR effective tax rates produced by identical investments in a RBIT base. For the purpose of comparing these impacts, Figure 5 below shows the IRR ETR produced by the three major cost recovery methods across a range of yield rates using our investment model. The yield rate ranges from 7%, which is 30% below the pre-tax discount rate of 10%, to 13%, which is 30% above it.

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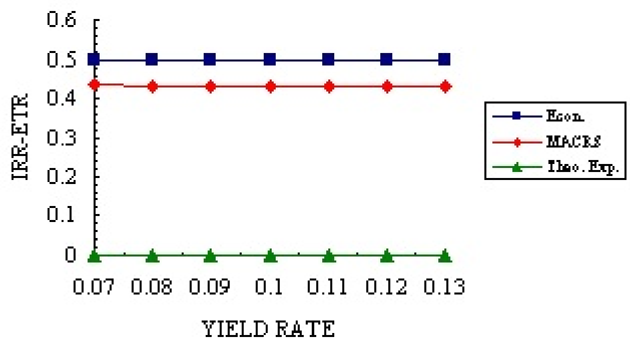
174. See supra notes 157-58 and accompanying text. See also discussion, infra Part VI.C.3. (text accompanying Figure 9) (discussing a similar effect in a RBIT base that uses economic cost recovery).

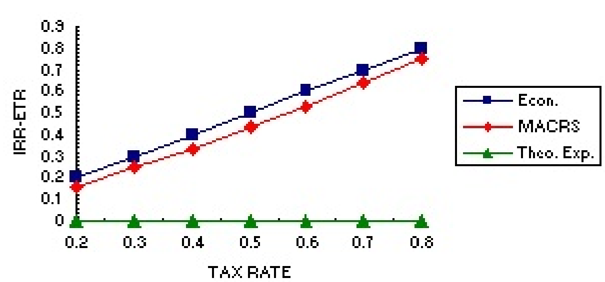
Figure 5: IRR ETR for Variable Yield Rates



If IRR ETR is the proper benchmark for comparing cost recovery methods, then economic cost recovery appears to be the normative cost recovery method for a RBIT because its IRR ETR tracks the nominal tax rate exactly at all yield rates. Under this rationale, MACRS would be the next most accurate because it produces a constant IRR ETR of 44%, and expensing would be the least accurate because it produces a constant IRR ETR of 0%.

In Figure 5, the nominal tax rate was kept constant at 50% to show the effect of variable yields on IRR ETR. Figure 6 below is designed to analyze the impact of the three major cost recovery methods on IRR ETR across a range of tax rates. Therefore, in Figure 6, the yield rate is kept constant at 10%, while the tax rate varies from 20% to 80%.

Figure 6: IRR ETR for Variable Tax Rates



It is clear again that economic cost recovery always creates a certain relationship between the pre-tax IRR and the after-tax IRR of break-even investments. The after-tax IRR is always equal to the pre-tax IRR x 1 minus the tax rate. Thus, the IRR ETR, which is based on the formula $(IRR_1 - IRR_2)/IRR_1$, always equals the nominal tax rate, regardless of the tax rate, and regardless of the yield rate involved.[175] Economic cost recovery always produces what seems to be the ideal IRR ETR, at least in the context of a financial asset-based investment model.

However, this only happens because economic cost recovery is computed by annually discounting the future yield stream by the yield rate and annually deducting the resulting decrease in the yield stream's present value. Because the difference between the discounting factors for the pre-tax and after-tax yield streams is the tax rate (so that $y_2 = y_1 \times 1 - t$), the IRR's of the pre-tax and after-tax cash flows always bear the same ratio, and the IRR ETR always equals the nominal tax rate.

Expensing, on the other hand, does not start with one investment amount and discount the yield stream by two different discount rates that are related to each other by the tax rate. Instead, expensing involves two different investment amounts, the taxpayer's pre-tax investment and the taxpayer's after-tax investment, both of which produce a yield stream. Both the amounts of the investments and the yield streams are related to each other by the tax rate. Because pre-tax investment (I) produces yield (y), and because after-tax investment [I x (1 – t)] produces yield of [(I x y) x (1 – t)], the yield streams, although produced by different investment amounts, have identical *rates* of return, and that rate is (y). Thus expensed assets produce a 0% IRR ETR because $y_2/y_1 = 1$.

All told, analysis based on IRR ETR cannot establish that any RBIT base cost recovery method is the normative cost recovery method for a RBIT base. The IRR ETR criterion illustrates the different ways in which capital cost recovery methods impact a RBIT base financially, but ultimately, this criterion is insufficient to determine which of the cost recovery methods best accommodates RBIT base structural and accounting principles.

2. *NPV Effective Tax Rates.*—The use of NPV effective tax rates seems to support the normative status of capital expensing.[176] For example, Figure 7 below shows the NPV ETR produced by each cost recovery method across a range of yield rates using our baseline investment model. As in Figure 5, the tax rate is 50%, but the yield rates now range from 14% to 26%.

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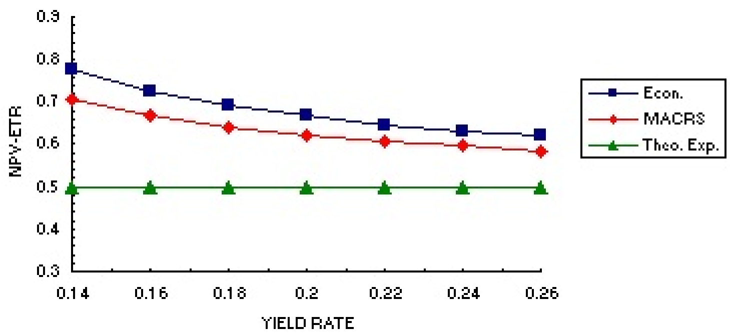
175. For example, when the tax rate is 40% and the yield rate is 10%, the IRR ETR is 40%. See supra Figure 6. When the tax rate is 50% and the yield rate is 12%, the IRR ETR is 50%. See supra Figure 5.

176. As noted earlier, NPV is deemed to be a more accurate financial indicator than IRR in general, so it should actually be more persuasive in evaluating the financial accuracy of cost recovery methods as they relate to capital income measurement. See supra note 93 and accompanying text. As with IRR ETR, it is also possible to use NPV ETR to compare the taxation of capital income in all three major tax bases.

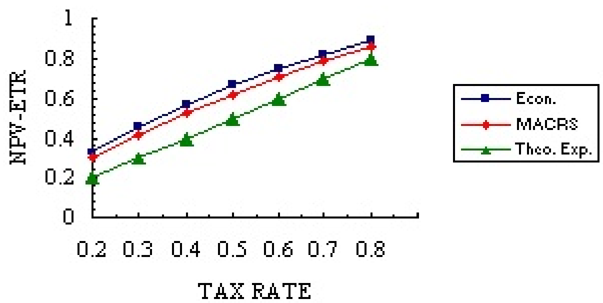
Figure 7: NPV ETR for Variable Yield Rates



Theoretical expensing, rather than economic cost recovery, now creates a normative financial effective tax rate at every yield rate shown, thus staking its claim to be the normative capital cost recovery method in a RBIT base. As shown earlier, economic cost recovery uses the pre-tax discount rate as a baseline and taxes yield to the extent of D_1 at a 100% NPV ETR. As a result, although economic (and to a lesser extent accelerated) cost recovery causes yield in excess of D_1 to be taxed almost at the ideal NPV ETR, the total NPV ETR never quite reaches the nominal tax rate.[177] These NPV ETR's show that the intrinsic function of economic cost recovery is to measure asset *value* instead of realized income, thus proving its invalidity as a device for normatively measuring realized capital income taxation in a RBIT base. Capital expensing is clearly the only cost recovery method that seems to cause normative capital income taxation of short-lived depreciable assets using NPV ETR as a financial criterion, at least under the circumstances shown in Figure 7.

177. The general slope of the economic cost recovery line is the same regardless of the range of yield rates if at least some of the yield rates exceed D_1. Although this phenomenon is diluted at higher yield rates, Figure 7 shows a range of yield rates that center around H_1, the taxpayer pre-tax hurdle rate. All investments portrayed in Figure 7 produce a positive NPV_2 of the ATCF, and all those over 20% yield show a positive NPV_1 of the ATCF.

Figure 8: NPV ETR for Variable Tax Rates at 20% Yield



While Figure 7 shows that the economic and accelerated cost recovery methods overstate and thus overtax capital income financially across a range of yield rates, Figure 8 shows that those same two cost recovery methods also overstate capital income financially across a range of tax rates. While the NPV ETR for expensing in Figure 8 always remains identical to the nominal tax rate, the NPV ETR's for economic and accelerated cost recovery are always greater than the nominal tax rate.[178]

The reasons for this financial over-taxation again stems from the fact that the yield rate, to the extent of the pre-tax discount rate, is taxed financially at a 100% effective tax rate, thus making the overall NPV ETR always exceed the nominal ETR at yield rates above the pre-tax discount rate.[179] In other words, the financial characteristics of economic cost recovery in a RBIT base are identical to the financial characteristics of economic depreciation in an AMIT base. Although economic cost recovery does not purport to measure net unrealized income, it produces the same financial results as a capital income taxation regime that does exactly that, albeit in a different tax base.

Based on NPV ETR, therefore, expensing seems to be the only cost recovery method that taxes capital income normatively in a RBIT base. Essentially, economic cost recovery seems to measure RBIT base income non-normatively because it measures unrealized income. And, accelerated cost recovery is non-normative because it is an artificial schedule of deductions that is simply designed to be "faster" (create a higher NPV_2 ATCF) than economic cost recovery. As such, accelerated cost recovery has no intrinsic relationship

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178. As explained earlier, the "bow" in the plot line for economic cost recovery is due to the interaction of D_2 and the tax rate as the latter increases. See supra note 167 and accompanying text.

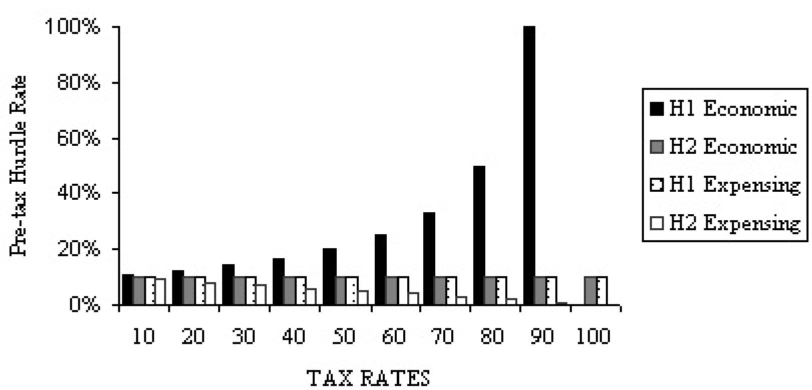
179. This occurs to a lesser extent with accelerated cost recovery, but occurs nonetheless.

to the financial structure or dynamics of any investment – or to the structural and accounting principles of a RBIT base.

Although the results of the IRR ETR analysis are inconclusive, and the results of the NPV ETR analysis appear to confer normative status on capital expensing, the next section of the article evaluates the structural appropriateness of economic cost recovery and capital expensing using hurdle rate analysis. The final section of this Part will integrate and summarize all three of these analyses and apply them to RBIT base structural and accounting principles.

3. *Hurdle Rates and the Financial Accuracy of Capital Cost Recovery Methods.*—An appropriate way to understand the *relationship* between financial accounting and the tax accounting created by a given cost recovery method is to compare a taxpayer's pre-tax hurdle rate (H_1) to the pre-tax discount rate (D_1) when that cost recovery method is employed. And, a useful way to evaluate the financial *impact* of a cost recovery method on the taxation of realized income is to compare a taxpayer's after-tax hurdle rate (H_2) to the after-tax discount rate (D_2).[180] Figure 9 below plots both the taxpayer pre-tax and the taxpayer after-tax hurdle rates for economic cost recovery and expensing at various tax rates.[181] The pre-tax discount rate remains constant at 10% per year for all investments.

Figure 9: Taxpayer Hurdle Rates for Economic Cost Recovery and Capital Expensing



180. The taxpayer hurdle rates refer to the discount rates that are necessary to create an ATCF with a positive present value using the pre-tax discount rate (for H_1) and after-tax discount rates (for H_2), respectively. See discussion supra Part VI.A.3.

181. It no longer seems necessary to continue to include accelerated cost recovery in the analysis. It has already failed to produce arguably normative financial characteristics under either the IRR ETR or NPV ETR benchmarks.

As suggested in the earlier analysis of hurdle rates in the context of CFIT base taxation, expensing causes RBIT base investments to have a taxpayer pre-tax hurdle rate (H_1) equal to the pre-tax discount rate (D_1). Thus H_1 for the expensed assets in Figure 9 always equals D_1, or 10%. This suggests that expensing is financially neutral as a cost recovery method because it does not affect the criterion by which investment decisions would be made in the absence of tax. The after-tax discount rate (D_2) in a RBIT base in the context of our model equals the pre-tax discount rate times 1-t, or D_1 x (1 – t). Thus, D_2 bears an inverse relationship to the tax rate. As Figure 9 shows, the after-tax hurdle rate for expensed assets (H_2) is identical to the after-tax discount rate (D_2), and bears the same inverse relationship to the tax rate as D_2 does to D_1. Thus, both D_2 and H_2 for expensed assets range from 9% for an asset subject to a 10% tax rate (10% x 90%) to 1% for an asset subject to a 90% tax rate (10% x 10%).

Economic cost recovery, on the other hand, requires a taxpayer pre-tax hurdle rate equal to the pre-tax discount rate *divided b*y 1 – t or D_1/(1 – t). Thus, for example, an asset subject to a 10% tax rate must produce a yield of at least 11.11% in order to produce a positive net present value after-tax using a 10% pre-tax discount rate.[182] Similarly, as Figure 9 shows, an asset subject to a 50% tax rate must produce a yield of at least 20% to achieve the taxpayer pre-tax hurdle rate because D_1/(1 – t) = .10/.5, which equals 20%. And finally, an asset subject to an 80% tax rate must produce a yield of at least 50% to reach H_1 because D_1/(1 – t) = .10/.2, which equals 50%. On the other hand, a taxpayer's after-tax hurdle rate for assets depreciated using economic cost recovery (H_2) always equals the pre-tax discount rate (D_1) in Figure 9. From that observation, one can infer that H_2 always equals D_1 if economic cost recovery is used in a RBIT base.[183]

The argument that expensing measures capital income normatively financially relates to the perfect coincidence of both taxpayer hurdle rates with the two financial discount rates in a taxed environment. When capital expensing is employed, RBIT base accounting is transparent with respect to the financial characteristics of investments (i.e., mirrors those characteristics exactly). The argument against expensing is that the taxpayer hurdle rates (both of which apply to after-tax cash flow) would not be identical to the discount rates if income produced by the asset were actually being taxed.[184]

The argument against economic cost recovery is that it is not financially neutral because the taxpayer pre-tax hurdle rate always deviates from the pre-tax discount rate and increases in relationship to the tax rate. Thus, the higher an investor's tax rate, the greater the investment yield that must be obtained in order for an investment to produce a positive net present that value after tax

182. Ten percent divided by .9 equals 11.11%.

183. This has already been shown with respect to economic depreciation in an AMIT base. See supra Part VI.A.3.

184. See supra note 170 and accompanying text.

using the pre-tax discount rate.[185] The counterargument would be that the pre-tax discount rate is the logical floor for taxpayers to use when initially determining whether a given investment will produce net income, whether realized or not. Since both the taxpayer pre-tax hurdle rate and the taxpayer after-tax hurdle rate apply to the after-tax cash flow, it is logical that neither hurdle rate would coincide with the discount rates, but exceed D_1 and D_2 by the reciprocal of $1 - t$, as they do.

4. *Summary.*—Ultimately, both NPV ETR and hurdle rate analysis show how and why the differences between economic cost recovery and expensing in a RBIT base reflect their different functions within their native tax bases. Economic cost recovery causes a RBIT base investment to emulate the taxation of depreciable assets in a normative AMIT base. Under this cost recovery method, the very existence of income from investment is dependent upon and is measured relative to the pre-tax discount rate. This is because no *net* increase in wealth is created in an AMIT base, or in a RBIT base using economic cost recovery, unless and to the extent the taxpayer's after-tax yield rate (H_2) equals or exceeds the pre-tax discount rate (D_1).[186] The pre-tax discount rate (which equals the taxpayer's after-tax hurdle rate) serves as a floor for determining the existence and amount of net increases in wealth after tax.[187] This causes non-normative taxation of investment yield based on both NPV ETR and hurdle rate analysis.

On the other hand, capital expensing in a RBIT base, like CFIT base cash flow accounting, ignores the relative value of the underlying asset and basically uses the after-tax discount rate as the floor for determining the existence and amount of income produced by a given investment. While no net *value,* and therefore no *accretion-measured income*, may be created by an investment return not in excess of D_1, *realized income* may be and is produced under those circumstances. Expensed investments produce a positive net present value after tax as long as they have an after-tax yield rate (H_2) in excess of the applicable after-tax discount rate (D_2). In addition, the NPV ETR's produced by expensing coincide with the nominal tax rate at all yield and tax rates. Thus, two of the three financial criteria employed in this analysis – NPV ETR and hurdle rate analysis – suggest that capital expensing normatively taxes the RBIT base capital income produced by short-lived fully-depreciating assets. In addition, by meeting these financial criteria, expensing makes the financial characteristics

185. Cf. Knoll, supra note 94, at 1801-05 (income tax) and 1808 (consumption tax).

186. Thus, the pre-tax hurdle rates are determined by grossing up that discount rate to arrive at a pre-tax hurdle rate. The gross up formula is $H_1 = D_1/1\text{-}t$.

187. Thus, for example, no net financial income is created after tax (NPV_2 ATCF >0), given a 50% tax rate, unless the yield rate exceeds 20%, which equals $D_1/1\text{-}t$. See supra Figure 9 and accompanying text.

of short-lived depreciable assets in a RBIT base consistent with the underlying non-tax financial characteristics of those investments.

VII. FINAL ARGUMENTS

A. *Empirical Summary*

Table 19 below summarizes all of the financial consequences produced by the taxation of short-lived completely wasting assets not only in a RBIT base using various cost recovery regimes, but also in AMIT and CFIT bases. This Table contains formulas that summarize the financial consequences of taxing these investments across the complete range of financial circumstances that this article has examined.[188]

Table 19: Summary of Tax-Related Financial Consequences for All Investments[189]

	IRR/ETR	NPV/ETR	H_1	H_2
AMIT Base	t	100%.....> t	$D_1/1\text{-}t$	$D_2/1\text{-}t$
CFIT Base	0	t	D_1	D_2
RBIT with econ cost recovery	t	100%....> t	$D_1/1\text{-}t$	$D_2/1\text{-}t$
RBIT with accel cost recovery	> 0 < t	<100%....> t	$> D_1$ $< D_1/1\text{-}t$	$> D_2$ $< D_2/1\text{-}t$
RBIT with capital expensing	0	t	D_1	D_2

188. Those circumstances include variable yield, tax and discount rates. A subsequent article will examine the impact of variable inflation rates on the financial characteristics of RBIT base cost recovery methods.

189. The information in Table 19 comes from the previous discussions in supra Part VI. See e.g., supra Part VI.A. for a discussion of AMIT base taxation; supra Part VI.B., for a discussion of CFIT base taxation; and supra Part VI.C., for a discussion of RBIT base taxation. Where a financial characteristic such as NPV ETR varies in relation to a range of external financial circumstances, such as yield, discount or tax rates, the formula given in Table 19 describes the range of values that particular financial characteristic exhibits across the range of financial circumstances examined in Part VI. For example, the NPV Effective Tax Rate of an asset subject to economic cost recovery in a RBIT base ranges from 100% where the yield rate equals the pre-tax discount rate (regardless of the tax rate) to slightly more than the nominal tax rate, t, at very high yield rates (regardless of the tax rate). See supra Figure 1, and accompanying text. Thus, the formula in the third column of the fourth row shows that the NPV ETR of an investment in a RBIT base that is subject to economic cost recovery ranges from "100% ...>t."

As this article has shown and as the first row in Table 19 reiterates, an AMIT base that normatively utilizes economic depreciation always produces an IRR/ETR equal to t, the tax rate, no matter what the surrounding financial circumstances may be.[190] On the other hand, an AMIT base always produces an NPV/ETR that is greater than t. Indeed, where the yield rate equals the pre-tax discount rate, the NPV ETR is 100%.[191] Finally, as shown earlier, the taxpayer hurdle rates in an AMIT base always equal the relevant discount rate divided by 1 – t.[192]

As reiterated in the second row of Table 19, this article has also shown that a CFIT base always produces an IRR/ETR of zero, an NPV/ETR equal to t, the tax rate, and hurdle rates that exactly equal the relevant discount rates under all of the financial circumstances analyzed in this article.[193]

An AMIT base and a CFIT base share the characteristics of financial conformity and consistency. In both tax systems, at least one financial characteristic of an investment always equals the nominal tax rate, t, no matter what external financial circumstances apply to the transaction. In an AMIT base, it is the IRR/ETR, while in a CFIT base, it is the NPV/ETR.[194] The qualities of financial conformity and consistency show that by at least one financial measure, the tax is applied exactly and uniformly to capital income across a wide range of financial circumstances.

In some respects, a CFIT base shows superior qualities of financial conformity and consistency in comparison to an AMIT base in that none of the mathematical formulas that define the financial characteristics of CFIT base taxation vary in response to external financial circumstances. The IRR ETR is always zero, the NPV ETR always equals the nominal tax rate, and the taxpayer hurdle rates are always identical to the discount rates.[195] In an AMIT base, the NPV ETR varies between 100% and a rate greater than t depending upon the

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190. See supra note 148 and text accompanying notes 145-48. Cf. supra Figure 5 and Figure 6 and accompanying text (characteristics of economic cost recovery in a RBIT base).

191. See supra note 185 and accompanying text.

192. See supra Part VI.C.3. See especially, supra Figure 9 and accompanying text and text accompanying supra notes 178-79.

193. See generally, supra Part VI.B. See also supra Table 17 and accompanying text. For the invariance of NPV ETR at variable yield and tax rates, see supra Figure 3 and Figure 4, respectively. For the invariance of IRR ETR see supra Figures 5 and 6 (characteristics of theoretical expensing in a RBIT base). For an analysis of hurdle rates in relation to CFIT taxation see supra Part VI.B.2.

194. See supra Table 19, second row and second column. With respect to an AMIT base, the formula for the IRR ETR of an economically depreciated asset always equals t, the tax rate. Cf. supra Table 19, third row and third column. The formula for the NPV ETR of an expensed asset in a CFIT base is also equals t, the tax rate, across a wide range of financial circumstances.

195. See the financial characteristics of CFIT base taxation in the third row of supra Table 19.

external financial circumstances affecting the transaction, and the hurdle rates, while maintaining a constant relationship to prevailing discount rates, differ from them in inverse ratio to one minus the tax rate and therefore change as the tax rate changes.[196]

The financial characteristics of RBIT base taxation depend on the cost recovery method employed. For example, in a RBIT base that utilizes accelerated cost recovery, as shown in the fourth row of Table 19, the IRR/ETR and the NPV/ETR vary according to external financial circumstances, and neither financial criterion ever equals the nominal tax rate.[197] Nor do the taxpayer hurdle rates ever bear any logical or steady relationship to the prevailing discount rates.[198] A RBIT base that employs accelerated cost recovery completely lacks the characteristics of financial conformity and consistency. If one assumes that some form of financial conformity and consistency is a hallmark of a normative capital income taxation regime, then no accelerated cost recovery can function as a normative cost recovery method for a realization-based income tax.

The choice of normative capital cost recovery method, for a RBIT base, therefore, appears to be between economic cost recovery and capital expensing. At this point, the financial characteristics of the two capital income taxation regimes standing alone provide an insufficient basis upon which to make a persuasive decision. Because the financial characteristics of economic cost recovery and capital expensing duplicate the financial characteristics of AMIT base and CFIT base taxation, respectively, one needs to incorporate a broader non-financial frame of reference into the analysis. In addition to evaluating each of the remaining two cost recovery methods for financial conformity and consistency, one must also evaluate each method for conformity and consistency with the fundamental structural and accounting principles of a realization-based income tax.

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196. See the financial characteristics of AMIT base taxation in the second row of supra Table 19.

197. The IRR ETR for accelerated cost recovery ranges between percentages greater than zero and those less than the nominal tax rate. These percentages always fall between the percentages for economic cost recovery and expensing, but never coincide with either one. As a result, they achieve neither conformity with the nominal tax rate nor consistency across any range of financial circumstances. See supra Figures 5 and 6. Similarly, the NPV ETR for the MACRS accelerated cost recovery method ranges between percentages less than 100% and those greater than t, showing a different aspect of non-conformity and inconsistency. See supra Figures 7 and 8.

198. The range of taxpayer hurdle rates for assets subject to accelerated cost recoveery can be inferred from the other analyses in this article. The range of financial characteristics produced by the accelerated cost recovery method consistently falls between the characteristics for economic cost recovery and expensing. See e.g., Tables 7 and 8 in supra Part II.F. See also supra Figures 5, 6, 7 and 8 and supra Part VI.C.3.

B. *Economic Cost Recovery is not the Normative Capital Cost Recovery Method for a RBIT Base*

The major structural principles of a RBIT Base are: (1) to tax realized invested earnings (capital creation); (2) to restore invested capital tax-free (capital cost recovery); and (3) to tax net realized investment yield (gross realized yield in excess of capital recovery). The major accounting principles of a RBIT base are to: (1) allow the tax-free return of capital through cost recovery deductions; and (2) to otherwise tax all net realized investment income. In the context of our investment model, this means that the tax base accounting dynamic is similar to that of an AMIT base: nominal income produced by a productive asset is included in the tax base but is at least partially offset by a deduction (or tax base reduction) associated with the asset. In a normative RBIT, however, the offsetting deduction should reflect the *cost* of capital invested in the asset rather than the declining *value* of the productive asset itself.

Economic cost recovery (cost recovery based on the financial characteristics of economic depreciation) fails to facilitate the second and third structural principles described in the previous paragraph or either of the accounting principles. First, economic cost recovery fails to implement the structural and accounting principle providing for the tax-free return of capital. Because cost recovery based on economic depreciation requires deferred cost recovery, the present value of economic cost recovery is less than the present value of the asset yield stream. The difference becomes Taxable Income, and the result is the financial under-recovery of asset cost and the financial over-taxation of asset yield.[199]

Second, economic cost recovery negates the realization requirement because it is based on an accretion or accrual accounting technique that measures unrealized decreases in an asset's value. Using such a cost recovery method to measure capital income is inconsistent with a RBIT base both as a structural and accounting matter. The overall structural problem caused by economic cost recovery is that it causes realized income (asset yield) to be netted against cost recovery based on unrealized changes in wealth; and neither asset yield treatment nor asset cost recovery treatment should violate the realization requirement in a normative RBIT base.

Third, economic cost recovery is appropriate for measuring unrealized changes in asset value, because those are determined by the relationship between D_1, the pre-tax discount rate, and a depreciable asset's yield rate. However, it is inappropriate for purposes of measuring net *realized* income. For example, the 100% financial tax rate imposed on the present value of a depreciable asset's yield stream (y) to the extent it equals (or is less than) the pre-tax discount rate (D_1), creates a persistent distortion in effective tax rates as

199. See discussion supra Part VI.A.2.

measured by net present value (NPV ETR). The correct financial tax rate is only imposed on yield in excess of that threshold, but even then, economic cost recovery continues to distort the overall NPV ETR. This is normative treatment for an AMIT base that measures value relative to the pre-tax discount rate, but it is inappropriate for a tax base accounting principle that requires measuring net realized income rather than inter-period asset value fluctuations and indirectly net unrealized income.

C. *Capital Expensing is the Normative capital Cost Recovery Method for a RBIT Base*

On the other hand, capital expensing as a cost recovery method provides normative structural treatment for short-lived depreciable assets in a RBIT base because it does not combine realization accounting for yield and non-realization accounting for cost recovery deductions in an effort to account for net realized income. As a result, capital expensing allows RBIT base accounting to focus properly and exclusively on measuring net realized income and to ignore unrealized changes in asset value, which is the *sine qua non* of AMIT base accounting. Capital expensing as a RBIT base *capital* cost recovery method is also structurally distinguishable from cash flow accounting for CFIT base investment. The former provides tax-free recovery of already-taxed dollars, while the latter causes the pre-tax investment of untaxed dollars. In both cases, the economic and financial yield produced by the investment asset is fully taxed – in a CFIT base because it is a positive cash flow, and in a RBIT base because it is realized income.

In terms of RBIT base accounting principles, capital expensing is the only RBIT base cost recovery method that provides full cost recovery financially, as shown in Part V. As a result, only true net financial income is taxed, and not disparities between the present values of realized gross income and financially insufficient cost recovery. Overall, expensing produces financial results that are completely consistent with the underlying financial characteristics and dynamics of an investment. For example, the pre-tax hurdle rate of an expensed asset is D_1, the pre-tax discount rate; and the after-tax hurdle rate is $D_{2,}$ the after-tax discount rate. Furthermore, investment yield is taxed proportionately at all yield rates, including the extent to which the yield rate, y, equals the pre-tax discount rate, $D_{1.}$ Unlike investments subject to economic cost recovery, there is no yield rate threshold equal to the pre-tax discount rate, below which all financial income is taxed at a 100% effective rate. As a result *all* realized income in excess of *full* capital recovery is taxed proportionally.

The major structural criticism of expensing *per se* as a cost recovery method in a RBIT base stems from its ability to shield pre-tax income from tax and to that extent cause a RBIT base to emulate a CFIT base, rather than an AMIT base. This emulation includes what commentators call the economic and/or financial exemption from tax of invested earnings,[200] and is explained through the metaphor of a taxpayer-government investment partnership.[201] As discussed earlier, however,[202] a RBIT does not exempt pre-tax earnings from tax to the extent that the amount invested does not exceed the natural RBIT base capital formation threshold. Nor does it emulate a CFIT base to the extent that investment equals (but does not exceed) that threshold. Beyond that point, the CFIT base emulation criticisms are true, but up to that point they are not.[203] Under these circumstances, therefore, *capital* expensing does not violate the normative structural principle of a RBIT base that allows cost recovery deductions only with respect to previously-taxed capital.

It is important to distinguish the "pre-tax dollar" investment dynamics involved in a CFIT base globally (and a RBIT base partially) on one hand, from the "after-tax capital formation" dynamics involved in a RBIT base that allows only invested capital to be expensed on the other. In a CFIT base, the taxpayer's pre-tax investment equals Investment, but her after-tax investment equals Investment x (1 – t) because the Investment offsets pre-tax dollars. Subsequently, her after-tax return on investment equals (Investment x y) x (1 – t). For example, in the CFIT base investment shown in Table 17, the after-tax investment of $50 produces a net financial return with a net after-tax present value of $5.93, which is approximately a 10% return on that after-tax investment. Literally, the tax has not reduced the return on after-tax investment.

On the other hand, because the RBIT base investments in our model are already made with after-tax dollars, a true CFIT-like taxpayer-government partnership is not involved. Nor are any earnings shielded from taxation by virtue of the expensing deduction, either economically or in financial terms.[204] Instead, structurally, the transaction resembles a "tax margin loan" in which the taxpayer does not need or use the tax savings in order to make the after-tax investment but implicitly *borrows* (Investment x t) from the government in the form of tax savings, repays the government with (Investment x y) x t, and keeps (Investment x y) x (1 – t) for herself. As long as the amount of Investment is below the RBIT base natural capital formation threshold, the taxpayer's *after-tax* economic investment still equals Investment (instead of Investment x (1 – t)), and the taxpayer's after-tax return equals (Investment x y) x (1 – t). Therefore, for example, an after-tax dollar investment of $100 that is expensed in a RBIT base produces the same net return of $5.93 after tax as a CFIT base after-tax investment of $50. That $5.93, however, represents only the correct net 5% return on the RBIT base investment of $100 of after-tax capital. Formulaically: (Investment x y) x (1 – t) = ($100 x 10%) x (1 - 50%).

200. See supra note 170 and accompanying text.
201. See discussion supra Part VI.B.1.
202. See discussion supra Part IV.B.
203. Id.
204. See supra note 130 and accompanying text.

In addition to being consistent with its structural norms and distinguishable from a CFIT base, a RBIT base that allows capital expensing produces financially correct results that are distinguishable from an AMIT base. The same net after-tax financial return of $5.93 that is structurally consistent with a normative RBIT base also provides a financial result that is correct from a normative tax base accounting perspective. As we learned earlier, economic cost recovery creates such a high hurdle rate that yield to the extent of D_1 is subject to a 100% effective tax rate as measured by NPV ETR. The result is an investment with a NPV_2 of zero, although it produces a 10% yield rate. This is not the case where asset cost is expensed because the taxpayer hurdle rates equal the discount rates. As a result, an expensed asset in a RBIT base with a 10% yield produces a financially logical and consistent result (5% net financial return after tax) that correctly measures all realized income (rather the asset's net financial value) *and* completely returns the initial amount of the taxpayer's capital investment tax-free as RBIT base structure requires.

VIII. CONCLUSION

Three major structural and accounting principles distinguish capital income taxation in a realization-based income tax (RBIT) from its counterparts in either an accretion-measured income tax (AMIT) or a cash flow income tax (CFIT). Those principles are capital formation, capital recovery, and realization. At or below the natural RBIT base capital formation threshold, all cash-financed investment is capital investment. When capital-financed investment is made in assets that are short-lived, self-exhausting, and likely to be worthless at the end of their useful lives, the capital formation principle is satisfied by definition, and capital cost recovery policy only requires consistency with the second and third principles. This article has shown that only immediate capital expensing is completely consistent with those principles. Thus, capital expensing, not economic depreciation, is the normative *capital* cost recovery method for a realization-based income tax.

If this conclusion is correct, U.S. cost recovery policy makers should take heed. The quest to implement economic depreciation will not convert the U.S. income tax into a true AMIT but will create an even more structurally inconsistent tax base that allows capital formation but does not allow full capital recovery, while measuring and taxing a mixture of realized and unrealized net income. The quest to implement unlimited expensing is also structurally inconsistent with a RBIT base. Although it would ostensibly measure and tax realized income, it would partially prevent the formation of true capital and partially allow the tax-free recovery of untaxed income. It would not completely implement a consumption tax base, but it would preclude the normative operation of the RBIT base currently in place.

Before policy makers implement either one of these sets of distortions, the assumption that either AMIT or CFIT base capital income taxation principles are normative or optimal for U.S. capital income taxation policy should be subjected to further questioning, and the initial normative RBIT base principles described in this article should be fleshed out. Some of the questions that should be asked include: what is the normative treatment of non-capital financed investment in a RBIT base? What is the normative treatment of non-depreciable or long-lived depreciable assets? What is the normative treatment of debt and debt-financed assets in a RBIT? And finally, does the normative treatment of capital income with respect to any or all of these issues define the optimal tax policy with respect to these issues for the U.S. income tax? This article has applied a limited range of normative RBIT base capital income taxation principles to one type of capital income in one particular economic context, but hopefully it has also suggested a new approach to resolving some or these broader tax policy issues in the future.