A General Approach to the Taxation of Financial Instruments

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Reed Shuldiner

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I. Introduction

The availability and variety of financial instruments has grown tremendously over the past decade. It is likely that this trend will continue. The tax law has struggled to keep up with the development of new financial instruments, responding to such instruments on an ad hoc and piecemeal basis. Unfortunately, the lack of a uniform theory guiding the development of the taxation of such instruments has led to rules that are often haphazard, incomplete, and inconsistent.
The shortcomings in the present tax treatment of financial instruments have high social costs. Uncertain rules increase compliance costs, provide opportunity for abuse, and discourage the legitimate development and use of financial instruments. Rules that are inconsistent with the underlying economics of a transaction distort behavior, lead to an inefficient allocation of resources, and have the potential of placing United States financial institutions at a competitive disadvantage in the world market.

Most, if not all, of these problems could be solved by abandoning our current realization system and adopting mark-to-market accounting for financial instruments.¹ While there has been some movement in this direction, it is unlikely that Congress (or the financial community) will accept wholesale use of mark-to-market accounting.² Absent mark-to-market accounting for financial instruments, there is a need to develop a general framework for determining the timing of income with respect to financial instruments within the overall confines of realization-based accounting. In this Article, I propose such a framework.

In Part II, I set out my assumptions as to the basic normative goals of the federal income tax. In particular, I assume that the tax system is to be judged by standards of efficiency and equity. In Part III, using a series of simple examples concerning the toss of a coin, I show how a pure realization tax accounting system performs poorly against such standards. In particular, equity and efficiency norms are violated by the deferral of taxation implicit in a realization system because deferral lowers the effective tax rate on financial transactions and, in addition, provides a valuable timing option. Deferral also offers the opportunity for tax straddles.³

Part IV provides an overview of current provisions in the tax law designed to deal with the problems inherent in a realization-based system and discusses the weakness of such solutions.

In Part V, I propose a set of uniform rules to account for financial instruments. In particular, I recommend (1) that such instruments be divided into their component parts and (2) that each component accrue income for tax purposes based on its expected future value. I refer to this approach as expected value taxation.

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¹ A realization system is one in which gain and loss is not recognized until there is a realization event, such as a sale or exchange of the instrument. A mark-to-market system is one in which gain and loss are recognized on a periodic basis, such as annually, without regard to the existence of a realization event. See infra text accompanying notes 7-12.

² Mark-to-market accounting for tax purposes has been accepted in certain circumstances. See infra note 9.

³ See infra text accompanying note 17.
In order to explore expected value taxation, in Part VI, I apply this approach to a series of increasingly complex wagers. In Part VII, I apply expected value taxation to a selection of typical financial instruments. In Part VIII, I discuss the weaknesses of my proposed approach, in particular the difficulties caused by the information requirements of expected value taxation.

II. Normative Framework for the Analysis

The expected value approach to the taxation of financial instruments is premised on two assumptions. First, the approach assumes that the appropriate tax base is income and that the appropriate effective tax rate is the statutory rate given the level of income. More particularly, I adopt the Haig-Simons definition of income, which can be stated as the sum of the value of the taxpayer’s consumption plus her change in wealth over the period of measurement. Absent other considerations, under the Haig-Simons definition of income, financial products, as with all other assets and liabilities, would be valued periodically, and the holder would be taxable on the change in value over the period. I refer to such an approach as “mark-to-market” or “full accrual.” The desirability of any particular

---

4. If, for example, the income tax were to be replaced by a consumption or expenditure tax, there would be no need to measure income with respect to financial instruments. Any investment in such instruments would be deductible from the tax base, and any realized returns from such instruments not reinvested would be includable in the tax base. Fluctuations in value would properly have no relevance until such values were realized and converted to consumption. See, e.g., Michael J. Graetz, Implementing a Progressive Consumption Tax, 92 HARV. L. REV. 1575 (1979); William D. Andrews, A Consumption-Type or Cash Flow Personal Income Tax, 87 HARV. L. REV. 1113 (1974). Our current system is, of course, actually a hybrid, having characteristics of both an income and a consumption tax. See Henry J. Aaron et al., Introduction to Uneasy Compromise: Problems of a Hybrid Income-Consumption Tax 1, 1 (Henry J. Aaron et al. eds., 1988) (hereinafter Uneasy Compromise) (“In practice, all tax systems are mixed or ‘hybrid’ systems that contain both income tax and consumption tax features.”).

5. See Robert M. Haig, The Concept of Income—Economic and Legal Aspects, in THE FEDERAL INCOME TAX 1, 7 (Robert M. Haig ed., 1921) (“Income is the money value of the net accretion to one’s economic power between two points of time.”); HENRY C. SIMONS, PERSONAL INCOME TAXATION 50 (1938) (stating that personal income includes “the change in value of the store of property rights between the beginning and end of the period in question”).

6. The precise assessment period is also a relevant variable. In theory, continuous assessment would be optimal. See Jeff Strnad, Periodicity and Accretion Taxation: Norms and Implementation, 99 YALE L.J. 1817, 1830-31 (1990) (arguing that continuous assessment taxation is superior to periodic assessment taxation). In light of administrative considerations and the general use of the annual assessment period, I assume that the annual assessment period is the appropriate norm.

7. More precisely, under a mark-to-market system, the holder of the instrument would be taxable on the change in value of the instrument over the period, plus any cash and the value of any property received, minus any cash and the value of any property paid. For example, assume that at the beginning of the period an instrument was worth $100 and that at the end of the period the instrument was worth $150. Assume also that during the period the holder of the instrument had received $15 and had been obligated to pay $25. In that case, the holder’s income for the period would be $40 ($150
approach to the taxation of financial instruments is, accordingly, measured against this norm. Deviations from the norm must be justified on the basis of other considerations, such as equity, efficiency, and administrability. 8

Second, the expected value approach assumes that the financial instruments in question will not in fact be taxed under such a full accrual system. Thus, the expected value approach should be judged not against the ideal of full accrual, but rather against other alternatives. The assumption that financial products will not generally be taxed on a full accrual basis is not meant to be an endorsement of this position. The tax law has already accepted mark-to-market accounting for certain assets and in certain contexts. 9 The question, therefore, is not whether mark-to-market accounting can or should be used, but rather where the line should be drawn. 10 Drawing the line to include all actively traded assets appears attractive and warrants further study. 11

- $100) + $15 - $25 = $40).

8. Considerations of equity, efficiency, and administrability often conflict. In the final analysis, tax policy involves an analysis of the extent to which any particular rule or set of rules deviates from these norms and a weighing of the social costs of such deviations. See generally Boris I. Bittker, Equity, Efficiency, and Income Tax Theory: Do Misallocations Drive Out Inequities?, in THE ECONOMICS OF TAXATION 19, 20-29 (Henry J. Aaron & Michael J. Boskin eds., 1980) (noting the conflict between the normative efficiency and equity standards).

9. A very recent example of mark-to-market accounting being used as an acceptable method of accounting is in the proposed regulations governing notional principal contracts that permit dealers and traders in such contracts to elect mark-to-market accounting for their contracts and for all hedges of the contracts. Prop. Treas. Reg. § 1.446-4, 56 Fed. Reg. 31350, 31361 (1991). For a description of notional principal contracts, see infra notes 296-97 and accompanying text. Section 1256(a) has, since 1982, provided that certain financial contracts including regulated futures contracts and certain foreign currency contracts are to be taxed on a mark-to-market basis. I.R.C. § 1256(a) (1988). Treasury Regulation § 1.471-5 has permitted securities dealers to use mark-to-market accounting for their inventories since at least 1988. I.R.C. § 1256(a) (1988). Treasury Regulation § 1.471-5 has permitted securities dealers to use mark-to-market accounting for their inventories since at least 1988. Treas. Reg. § 1.471-5 (as amended in 1987). It offers securities dealers three methods of inventory valuation: cost, market, and lower of cost or market. Id. As an apparent quid pro quo for adopting mark-to-market accounting for notional principal contracts, securities dealers are required to forsake the use of lower of cost or market on their securities and commodity inventories. Prop. Treas. Reg. § 1.446-4(a)(3), 56 Fed. Reg. 31350, 31361 (1991). The recent tax bill contained at least two additional mark-to-market provisions. See the Tax Fairness and Economic Growth Act (the "Bill"), H.R. 4210, 102d Cong., 2d Sess. (1992), passed by the House and Senate, then vetoed by the President on March 20, 1992. Section 3204 of the Bill added new code § 475 which generally would have required dealers in securities to account for their securities inventory on a mark-to-market basis. Section 4402 of the Bill added, inter alia, new code § 1291 which would have required certain owners of marketable stock in passive foreign corporations to recognize gains and losses (to the extent of previously recognized gains) on a mark-to-market basis. New code §§ 475 and 1291 were again included in §§ 3001 and 4402, respectively, of the Revenue Bill of 1992, H.R. 11, 102d Cong., 2d Sess. (1992), passed by the House on October 5, 1992, passed by the Senate on October 8, 1992, and vetoed by the President on November 5, 1992. While these new mark-to-market provisions were twice vetoed, it is likely that they will eventually become law.


11. The definition of "actively traded" would of course have to be fleshed out. See Prop. Treas. Reg. § 1.1092(d)-1, 56 Fed. Reg. 31350, 31361 (1991) for a recent attempt to define "actively traded" for purposes of the straddle rules.
At the opposite extreme of a full accrual system is a pure realization system. Under a pure realization system, gains and losses on financial assets would be taxable only at the time of a realization event such as the termination of the taxpayer's investment in the asset. 12

A pure realization system raises a number of problems. First, to the extent that taxation of gains and losses are deferred, the effective tax rate on such gains and losses is less than the statutory rate. 13 This problem, which I will refer to as pure deferral, may be anticipated or unanticipated. By anticipated deferral, I mean situations where, as of the commencement of the transaction, there is an expected gain or loss from the transaction, the taxation of which will be deferred. By unanticipated deferral, I mean situations where on an a priori basis the expected value of any deferral is zero, 14 while on an ex post basis there is in fact deferral of gain or loss. 15

12. The precise definition of a realization event is unclear and is beyond the scope of this Article. In general, gain or loss is realized on the sale or other disposition of property. Treas. Reg. § 1.1001-1(a) (as amended in 1972). A disposition generally includes an exchange for other property so long as the other property differs materially in kind or extent. Id.; see Cottage Savings Ass'n v. Commissioner, 111 S. Ct. 1503, 1508 (1991) (stating that a realization event for the “disposition of property” only occurs if the properties exchanged are “materially different”). Frequently, despite a realization event, the recognition of gain or loss is deferred. See, e.g., I.R.C. § 1031 (Supp. II 1990) (deferring recognition for a like-kind exchange); id. § 1032 (1988) (deferring recognition for an exchange of stock for property); id. § 1033 (1988) (deferring recognition for involuntary conversions); id. § 1034 (West Supp. 1992) (deferring recognition for a rollover of gain on the sale of a principal residence).

13. This point is easily demonstrated. Consider an investment that has yielded a gain of $500. Assuming a 30% tax rate, the appropriate tax on the gain is $150. If the payment of the tax is deferred for one year, the present value of the tax liability (assuming a 10% discount rate) drops to $136. In present value terms, this is equivalent to an effective tax rate of only 27%. The longer the period of deferral, the lower the equivalent effective tax rate. Similarly, the higher the discount rate, the lower the equivalent effective tax rate. For example, a deferral of 20 years with a discount rate of 15% would imply an effective tax rate of only 2%. The general formula is:

\[
\text{effective tax rate} = \frac{TR}{(1 + r)^n},
\]

where \(TR\) = nominal tax rate, \(r\) = discount rate, and \(n\) = number of years.

The “tax” on a loss is, of course, negative rather than positive. In other words, it is a tax savings, not a tax cost. If a $500 loss is deferred one year and the marginal rate is 30% the present value of the $500 tax savings is only $156. That is equivalent to the current tax savings at a 27% tax rate. Because 27% is less than 30%, the taxpayer has a lower effective tax rate on the loss and a smaller tax savings. Therefore, the overall tax burden on the taxpayer has increased.

14. When I refer to the expected value of deferral as zero, I mean to include both situations where there is no expected gain (or loss) and situations where there is expected gain (or loss), but it is expected that there will be no deferral of tax liability on such gain (or loss). These are sufficient but not necessary conditions for the expected value of deferral to be zero. For example, the expected value of deferral could be zero in a transaction in which there is expected to be deferral of both gain and loss, but the present value of the deferral of the gain is equal to the present value of the deferral of the loss.

15. The significance of deferral from a tax policy perspective may well depend on whether it was
A second problem with a pure realization system is that, to the extent that taxpayers have the ability to selectively recognize losses while continuing to defer gains, the value of deferral is increased. I refer to this phenomenon as the timing option.\textsuperscript{16}

Third, under a realization system taxpayers may be able to engage in transactions that in the aggregate produce no gain or loss, but that can be disassociated into two or more parts, one or more of which produces gain and one or more of which produces loss. This type of transaction is known as a tax straddle.\textsuperscript{17}

Although the problems of pure deferral, the timing option, and the tax straddle are closely related, it is analytically useful to separate them because it enables a clearer understanding of the weaknesses of a realization approach and facilitates the development of alternative solutions. In the next section, I further develop the concepts of pure deferral, the timing option, and the tax straddle using a series of simple examples.

III. Timing Problems Caused by a Realization System

This Part presents five examples of simple transactions involving bets and deferred or accelerated payments. The examples are used to demonstrate how, under a pure realization system, such transactions provide opportunities for deferral, use of the timing option, and creation of tax straddles. Finally, the efficiency and equity consequences of these opportunities are discussed.

A. Anticipated Deferral

1. Example 1: Diva pays David $100 today, and, in exchange, David promises to pay Diva $121 in two years.

In Example 1, the value of Diva's right to payment is expected to increase over the entire two-year period.\textsuperscript{18} If the tax system fails to anticipate or unanticipated. See infra subpart III(A) for a more complete discussion of anticipated and unanticipated deferral.

\textsuperscript{16} See Strnad, supra note 6, at 1879 (defining the timing option as "the ability to take losses early and defer any later matching gains"). Strnad cites George M. Constantinides, Capital Market Equilibrium with Personal Tax, 51 Econometrica 611 (1983), as the source of the phrase "timing option." Strnad, supra note 6, at 1879. See infra subpart III(B) for an explanation of the timing option.

\textsuperscript{17} See Jerry W. Markham, Commodities Regulation: Fraud, Manipulation & Other Claims § 14.01 (1987). See infra subpart III(C) for a more detailed discussion of tax straddles.

\textsuperscript{18} The value of the right to receive future payments is equal to the present value of the future payment. In general, the present value of a future payment is equal to:
account for this income as it is earned, the effective tax rate will be less than the statutory rate on Diva’s gain and on David’s loss. Assuming that the value of David’s obligation to pay $121 in two years increases on a constant yield basis, it will be worth $100 at the time Diva pays David, $110 in one year, and $121 at the end of the second year. Diva’s income is, therefore, $10 in the first year and $11 in the second year. Under a pure realization system, however, Diva will be taxed on her $21 of gain only at the end of the second year. She will therefore defer payment of tax on $10 of income for one year. Moreover, David and Diva know there

\[ PV = \frac{FV}{(1+r)^t}, \]

where \( PV \) is the present value, \( FV \) is the amount of the future payment, \( r \) is the discount rate, and \( t \) is the time remaining until payment. Therefore, as long as it is assumed that the discount rate is constant risk, the value of the future payment increases as the time to payment decreases. See generally Richard A. Brealey & Stewart C. Myers, Principles of Corporate Finance 29-41 (4th ed. 1991) (explaining the calculation of present values). Example 1 is, of course, equivalent to a zero-coupon bond.

19. By “constant-yield basis,” I mean that the discount rate stays constant over the entire term of the obligation.

20. Such deferral is equivalent to a reduction in the effective tax rate. See supra note 13.

This analysis assumes that both the pure realization and the full accrual system measure income on a taxable year basis. It ignores the effect of estimated tax liability. More importantly, this analysis ignores the effect of inflation. Assuming inflation, much of Diva’s gain and David’s loss is pure inflationary gain or loss. Under a perfectly indexed tax system, such gain or loss would not be taxed. Given that the current system determines gain and loss without regard to inflation, the effective tax rate on capital transactions can be well in excess of the statutory rate. For example, consider a $100 investment held for one year and then sold for $105. Assume that the rate of inflation is five percent. In that case, the real gain on the transaction is zero, while the nominal gain is five dollars. If nominal gains are subject to tax at a rate of 20%, the tax liability on the transaction would be one dollar. As measured against the real gain of zero, the one dollar tax liability, or for that matter any tax liability, represents an infinite effective tax rate.

Inflation is a serious problem under both a full accrual system and a pure realization system. In either case, the appropriate solution is basis indexation. While basis indexation has been considered at various times, it has always been rejected, primarily for administrative reasons. See, e.g., David F. Bradford, U.S. Treasury Dep’t, Blueprints for Basic Tax Reform 75 (2d ed. 1984) (arguing that “inflation adjustment would introduce additional complexity”); 2 U.S. Treasury Dep’t, Tax Reform for Fairness, Simplicity, and Economic Growth 152-72, 178-200 (1984) [hereinafter Treasury I] (proposing a comprehensive indexation scheme, including depreciable property, capital assets, inventories, and indebtedness); U.S. Treasury Dep’t, The President’s Tax Proposals to the Congress for Fairness, Growth, and Simplicity 164-77 (1985) (eliminating proposals in Treasury I for indexation of depreciable assets and indebtedness while maintaining proposals to index capital assets and inventories). A proposal for indexing was passed by the House as part of the capital gains provision in the 1989 Act. H.R. 3299, 101st Cong., 1st Sess. § 11961 (1989) (adding new § 1022 of the Code providing for indexing of basis in certain circumstances). Representative Archer introduced a similar bill in the 102d Congress. H.R. 246, 102d Cong., 1st Sess. (1991).

Because inflation and deferral work in opposite directions, deferral has been pointed to as an ad hoc solution to inflation. See Daniel Halperin & Eugene Steuerle, Indexing the Tax System for Inflation, in Uneasy Compromise, supra note 4, at 347, 356 (arguing that “almost all forms of capital income receive some form of ... ad hoc indexing under current law”). The implication of this
will be deferral before they enter into the transaction. In other words, the deferral is anticipated. By contrast, under a full accrual system, both parties would be taxed as the value of the contract changed over the two-year period.

2. **Example 2**: Diva promises to pay David $121 in two years, and David promises to pay Diva either $142 or $100 at the same time depending on the toss of a coin. The coin toss occurs at the end of the two years.

There is no deferral, either anticipated or unanticipated, in Example 2. Until the toss of the coin the bet is worth nothing. It is only once the coin is tossed that the value of the bet changes. The payoff, however, is made immediately, and there is no opportunity for deferral. Under either a full accrual or a pure realization approach, Diva would be taxed at the same time.

3. **Example 3**: Diva pays David $100 today, and David promises to pay Diva $142 or $100 in two years depending on the toss of a coin at the end of the two years.

In Example 3, there is ex ante anticipated deferral of income, despite the fact that ex post there may be a loss, not income, from the argument is that, given inflation, deferral is not a problem. The relationship between deferral and inflation is very loose, grossly overcompensating some taxpayers and grossly undercompensating others. Moreover, such arguments fail to recognize the various manifestations of deferral, including unanticipated deferral, the timing option, and straddles. For these reasons I believe it is unwise to rely on the failure to index the tax system for inflation as a solution for problems caused by deferral.

On the other hand, to the extent the realization requirement is weakened and the tax code moves towards full accrual accounting, the problem of inflation does become more significant and begins to demand a solution. From a revenue point of view, the increased revenue that is likely to flow from the adoption of accrual accounting could be used to pay for the likely revenue loss from indexation.

21. In Example 2, the parties have entered into a current agreement for a future wager. It is essentially a forward contract. To see this more clearly, consider a commodity X; the price of X can take on only two values, $100 or $142. A cash-settlement forward contract to purchase X in two years at a price of $121 would have exactly the same payoff as the payoff in the coin toss in Example 2. Seeinfra text accompanying notes 258-60 for a discussion of forward contracts, including cash-settlement forward contracts.

22. I define the value of the bet to be the expected present value of the payoff from the bet. In Example 2, there is a 50% chance that Diva will have to pay $21 in two years and a 50% chance that she will receive $21 at the same time. The expected payoff in two years is, therefore, zero. The present value of the expected payment of zero is also zero.

23. Under a full accrual approach, the taxation would be triggered by the outcome of the coin toss, while under a pure realization approach, the taxation would be triggered by the payment (i.e., the realization event). Because these two events are contemporaneous, taxation would occur at the same time under either approach.

24. Example 3 is merely a combination of Examples 1 and 2, a loan and a forward wager.
transaction. The expected payment by David to Diva is $121 at the end of two years.\textsuperscript{25} In exchange for this expected payment, Diva pays $100 currently. Diva thus has expected income of $21 accruing over the two-year period. At that time, Diva will have additional income of $21 (if she wins) or a loss of $21 (if she loses).

Another way to see that Diva has an anticipated (and actual) deferral of income, even though she may ultimately have no income on the transaction, is to consider what would happen if she sold her right immediately prior to the coin toss. Immediately prior to the toss, the value of her right to receive payment should be approximately $121.\textsuperscript{26} Because she paid only $100 for this right, she has income of $21, regardless of the outcome of the subsequent coin toss. The new holder of the bet would then have a gain or loss of $21, depending on the outcome of the toss. The result should be no different if Diva does not sell her rights: her bet is still worth $121 immediately prior to the toss. Thus, in an economic sense, she has income of $21 as of that moment. Her subsequent loss or doubling of her income should not obscure the fact that she has already earned the first $21.\textsuperscript{27} Under a realization-based system, Diva would not be taxed on her expected income prior to the end of the transaction. Under an accrual system, she would be taxed over the term of the transaction as the expected income accrued.

4. \textit{Example 2A}: The facts are the same as Example 2 but the coin toss occurs immediately after Diva and David enter into the agreement. Payment is still made at the end of two years.

5. \textit{Example 3A}: The facts are the same as Example 3 but the coin toss occurs immediately after Diva and David enter into the agreement. Payment is still made at the end of two years.

Examples 2A and 3A differ from Examples 2 and 3, respectively, in that the coin toss occurs immediately after the bet is made, rather than at the end of the two-year period. Consider first Example 2A, an example of unanticipated deferral.\textsuperscript{28} As of the time of the bet, the expected

\textsuperscript{25} The expected payment is determined by multiplying each payoff by its probability. See \textit{supra} note 22. In this example, there are two possible payoffs, $100 and $142, each with a probability of 50%. The expected payoff is thus $121.

\textsuperscript{26} The exact value of her right would, of course, depend on the market. Assuming that there was a large enough market for such bets, the market price should be driven to $121, the expected payoff. All of the examples assume that there are no transaction costs.

\textsuperscript{27} The fact that there is anticipated deferral in Example 3 should come as no surprise given the observation that Example 3 is merely a combination of Examples 1 and 2. In Example 1 Diva has anticipated deferral and in Example 2 Diva has no offsetting acceleration of income, therefore it must be the case that Diva has anticipated deferral in Example 3.

\textsuperscript{28} Whereas Example 3 is made up of a loan followed by a wager, Example 2A is essentially a
income from the bet, as in Example 2, is zero. Once the coin is tossed, however, the situation changes. Assume that Diva wins the coin toss. She has economic income as of the time of the toss by virtue of David’s obligation to make a net payment of $21 in two years. The amount of the economic income can be determined by discounting the future payment. Assuming a discount rate of ten percent, the present value of the future payment and, therefore, the amount of current economic income would be $17.36. In addition, Diva would have additional interest income of $3.64 accruing over the two-year period leading up to the payoff. In a full accrual system, Diva would be taxed on the $17.36 of income at the time of the coin toss and would accrue the remaining $3.64 over the two-year period. In a pure realization system, she would be taxed on the entire $21 at the end of the two years. As a result of the deferral, the effective tax rate on her gain is reduced.

An essential characteristic of Example 2A is that it is not possible to determine whether the deferral will be in favor of the taxpayer or against the taxpayer at the time the transaction is entered into. If the taxpayer wins the wager, she will have income, the taxation of which will be deferred. If she loses the wager, she will have a loss, the taxation of which will also be deferred. In expected value terms, the amount of deferral is zero.

Example 3A is the most complicated. As with Example 3, Diva has expected income of $21 over the two-year period. To see this result, consider Diva’s position. If the coin toss is in her favor, she will own David’s promise to pay $142 in two years, which will be worth approximately $117.36. She will thus have immediate income of $117.36 and additional “interest” income of $24.64 over the two years. If she loses, she will be owed only $100, which will be worth $82.64. She will thus have an immediate loss of $17.36 and will earn $17.36 in interest income over the two years. Therefore, whether she

wager followed by a loan.

29. $17.36 is $21.00 discounted at 10% for two years.
30. At this stage, it is assumed that there is no realization event prior to the time of payment at the end of the two-year period. For the results when this assumption is relaxed, see the discussion of the effect of the timing option, infra subpart III(B).
31. Because the expected income is zero, the expected deferral must also be zero. See supra note 14. This result is the key difference between Example 2A and Examples 1 and 3.
32. $117.36 is $142 discounted at 10% for two years.
33. $17.36 = $117.36 - $100 (present value - cost).
34. $24.64 = $142.00 - $117.36 (future value - present value). I use the term “interest income” to distinguish income from the passage of time as opposed to income from the outcome of the wager. I do not mean to suggest that a portion of the income should or should not be characterized as income for federal income tax purposes. Questions of character are generally beyond the scope of this Article.
35. $82.64 is $100 discounted at 10% for two years.
36. $17.36 = $100.00 - $82.64 (cost - present value).
wins or loses, she will earn interest income. The expected amount of interest income she will earn is $21, exactly the same as in Example 3. In addition to the expected deferral of $21, Diva will also have actual deferral of the $17.36 gain or loss. The expected amount of this later gain or loss is, however, zero. Accordingly, there is no expected deferral with respect to such gain or loss. In summary, Example 3A involves both anticipated and unanticipated deferral.

B. The Timing Option

The timing option refers to the taxpayer's ability to selectively recognize gains and losses.\textsuperscript{37} Under a full realization system, the timing option exists because the taxpayer generally has the ability to force a realization event with respect to a loss by disposing of the property while deferring realization of gain by continuing to hold the property.\textsuperscript{38} Under a full accrual system, there is no timing option because both gain and loss are recognized each period without regard to a realization event or other action of the taxpayer.

\textsuperscript{37} See supra note 16 (defining the timing option). The importance of the timing option is well known to tax practitioners. In addition, its importance has also been recognized in the academic literature. See generally Joseph E. Stiglitz, The General Theory of Tax Avoidance, 38 NAT'L TAX J. 325, 325 (1985) [hereinafter Stiglitz, The General Theory] (stating that the "[p]ostponement of taxes" is the first "basic principle[] of tax avoidance," and explaining that the "present discounted value of a postponed tax is much less than that of a tax currently paid"); Joseph E. Stiglitz, Some Aspects of the Taxation of Capital Gains, 21 J. PUB. ECON. 257, 259 (1983) [hereinafter Stiglitz, Some Aspects] (listing investment strategies that, assuming a perfect capital market and the absence of anti-abuse rules, would enable an individual to avoid paying any income tax under a realization-based system); Strnad, supra note 6, at 1825-30 (discussing the impact of timing on a simple hypothetical transaction).

\textsuperscript{38} This Article generally focuses on reducing the effective rate of taxation by deferring gains and accelerating losses. It is important, however, not to lose sight of the fact that for some taxpayers it may be important to accelerate gains and defer losses. For example, a taxpayer with expiring net operating losses would wish to extend the use of the losses by realizing current income and deferring gain, thereby using the current expiring losses and creating new losses with a fresh carryover period. Thus, for some taxpayers, deferral has value when it is loss, rather than gain, that is being deferred. This consideration is equally true for all of the manifestations of deferral discussed in this Article.

One of the problems with many of the conventional approaches to the timing rules is that they lose sight of the fact that acceleration of income is a two-edged sword. See, e.g., Virginia Iron Coal & Coke Co. v. Commissioner, 37 B.T.A. 195 (noting that the taxpayer argued that the option premium should be taxable in the year paid, not in the year when the option expired unexercised), aff'd, 99 F.2d 919 (4th Cir. 1938), cert. denied, 307 U.S. 630 (1939); Martin D. Ginsburg, The National Office Mission, 27 TAX NOTES 99, 100 (1985) ("[E]very stick crafted to beat on the head of a taxpayer will, sooner or later, metamorphose into a large green snake and bite the Commissioner on the hind part. Nothing, you see, works one way in the tax field. Those folk out there are exceedingly ingenious. If, in aid of particular mayhem, you espouse an interpretation too narrow or too broad or just plain skewed, before you can turn around the tax bar will do you in.") In part, the recognition of this symmetry lies behind the balanced approach taken with respect to notional principal contracts in Prop. Treas. Reg. § 1.446-33, 56 Fed. Reg. 31350, 31354 (1991), and its predecessor, I.R.S. Notice 89-21, 1989-1 C.B. 651.
The effect of the timing option is to lower the effective tax rate on gains relative to the effective tax rate on losses and, therefore, the expected effective tax rate on the transaction as a whole.\textsuperscript{39} Consider Example 3A. Immediately after the coin toss, Diva has either a gain or loss of $17.36. Assume that she has a loss and immediately disposes of the asset. Assuming a thirty percent tax rate, she will have an immediate tax savings of $5.21 and her effective tax rate on the loss will be thirty percent, the full statutory rate. By contrast, assume that she has a gain and holds onto the bet until the end of the two-year period. In that case, her tax obligation of $5.21 on the gain will be deferred two years.\textsuperscript{40} In present value terms, her obligation will cost her only $4.31.\textsuperscript{41} The effective tax rate on her gain is, therefore, only twenty-five percent.\textsuperscript{42} In other words, the effective tax rate on a gain is only eighty-three percent of the effective rate on a loss.\textsuperscript{43}

The timing option is also present in Example 2A. Consider Diva, who has promised to pay $121 in exchange for either $100 or $142.

\begin{align*}
\text{Gain Rate} &= \frac{1}{(1+r)^n} - \text{Loss Rate}.
\end{align*}

where \( r \) is the discount rate and \( n \) is the number of years of deferral. In this example the discount rate is 10% and the number of years of deferral is two. Therefore, the gain rate as a percentage of the loss rate is 83% (83% = 1 / (1 + .10^2)).
the coin is tossed, she knows with certainty whether she has a gain or a
loss. If she has a gain, she can choose to defer the gain for two years. If
she has a loss, she can take it immediately. The timing option is not,
however, available in Examples 1, 2, or 3. Example 2 has no deferral,
either anticipated or unanticipated, and, as a result, there can be no timing
option. Examples 1 and 3 both have anticipated deferral, but no unan-
ticipated deferral. 44 While anticipated deferral has the effect of lowering
the effective tax rate, it does not present the timing option. 45

C. Straddles

The problem with the timing option from a taxpayer's point of view
is that it is merely an option, rather than a certainty. The fact that it is an
option does not mean that it is unimportant, without value, or without cost
to the system, but merely serves to limit its value. If, however, a taxpayer
can place herself on both sides of a transaction, she can convert the option
into a certainty, thus ensuring a realizable loss where there is no loss on
the overall transaction. For example, consider a taxpayer who engages in
two transactions similar to the transaction described in Example 2A. In the
first transaction, the taxpayer bets on the coin coming up heads. In the
second, the taxpayer bets on tails. Regardless of the coin toss, the
taxpayer will have an equal gain and loss, enabling the current realization
of a loss and the deferred realization of a gain without any risk of
economic loss. 46 In essence, the taxpayer has converted the timing option
into a certain deferral.

44. The statement that Examples 1 and 3 have no unanticipated deferral is not strictly true.
Consider Example 1, the exchange of $100 today for $121 in two years. I have assumed that the
income from the exchange accrues along an expected path during the two-year period. Assume,
however, that immediately after the $100 payment is made, interest rates drop to one per cent.
As a result, the right to receive $121 in two years would immediately be worth approximately $119
and the remaining $2 in income would accrue over the remaining two years. To the extent that this actual
accrual path exceeded the expected accrual path, there would be unanticipated deferral in addition to
the anticipated deferral.

45. As Example 3A shows, anticipated deferral and the timing option are not mutually exclusive.
See supra text accompanying note 36. In other words, a transaction can have both anticipated deferral
and the timing option. The point is only that anticipated deferral does not itself present the timing
option. The transaction must have unanticipated deferral for the timing option to exist. Paradoxically,
a reduction in anticipated deferral due to the accrual of expected income can have the side effect of
creating unanticipated deferral and, therefore, the timing option. See infra note 181 (demonstrating that
accruing expected income can create an opportunity to take advantage of a taxable loss that would
otherwise not exist).

46. See infra text accompanying notes 161-72.
D. Efficiency Consequences

There are both efficiency and equity consequences to deferral, the timing option, and tax straddles. This subpart focuses on the efficiency consequences. As discussed above, anticipated deferral lowers the effective tax rate on a transaction. The reduced effective tax rate distorts investment decisions in two ways: by encouraging overinvestment in the transaction relative to other transactions and by encouraging investment by high-bracket taxpayers relative to low-bracket taxpayers. The first effect occurs because the after-tax yield on the transaction will be higher than similar transactions where the yield is taxed currently. The second effect occurs because as the tax benefit becomes capitalized in the price of the investment, the pre-tax yield on the investment drops. As the pre-tax yield on the investment drops, it becomes less attractive to lower-bracket taxpayers. Thus, the existence of investments for which there is expected deferral leads to an inefficient allocation of resources.

The efficiency consequences of unanticipated deferral differ from the efficiency consequences of anticipated deferral. First, consider unanticipated deferral assuming that there is no timing option. In the absence of the timing option, the effect of unanticipated deferral is to lower the effective tax rate on losses and gains equally. Reducing the effective tax rate has the effect of increasing the variance of returns from the transaction, without affecting the mean return. In other words, it increases the risk of the transaction relative to a fully taxed investment.

Consider again Example 2A in which Diva promises to pay David $121 in two years in exchange for David’s payment to Diva of either $100

47. See supra text accompanying notes 13-15.
48. Capitalization of tax benefits occurs in a variety of contexts. The classic example is tax-exempt municipal bonds. In theory, because of their tax-free returns, the price of municipal bonds is bid up until, for the marginal investor, the after-tax yield on municipal bonds is equal to the after-tax yield on comparable corporate investments. As a result, the pre-tax yield is below the pre-tax yield on comparable corporate investments. This, in turn, provides a disincentive for tax-exempt and low-bracket taxpayers to invest in municipal bonds. To the extent that municipal bond yields are less than taxable yields, the value of the tax benefit is passed from the holder of the bond to the issuer. If the tax-free yield is equal to the after-tax yield on corporate bonds, all of the tax benefit is being captured by the issuer and the holder receives no benefit. See Bittker, supra note 8, at 22-23. Historically, the benefit of the tax-exemption has generally been split between the municipalities and high-bracket holders. See Michael J. Graetz, Federal Income Taxation: Principles and Policies 266 (2d ed. 1985).
49. An additional source of inefficiency may come from the effect of taxation of alternative financial instruments on the choice of the financial structure of a business entity. For example, assume that the tax rules are such that any loss must be deferred until such time as the gain would otherwise be recognized.
50. Remember, the expected value of the deferral is zero. See supra note 14 and accompanying text.
52. The risk borne by a taxable investor in an investment with unanticipated deferral is, however, still less than the risk borne by a tax-exempt investor.
or $142, based on an immediate coin toss. After the coin toss, Diva will have either an asset or a liability worth approximately $17.36. Under a pure realization system with a thirty percent marginal rate, Diva would be liable for a tax of (or would receive a refund of) $6.30 in two years. In present value terms, she would have an after-tax gain or loss of $12.15. Under a full accrual system, however, she would have an after-tax gain or loss of only $11.20. Because the deferral is unanticipated, under both a pure realization and a full accrual system, the expected after-tax value is zero. The difference is in the range of the outcomes. In other words, the difference in the tax regimes affects the risk inherent in the transaction, but not the expected return. By increasing the risk, a pure deferral system would be likely to decrease the demand for such transactions.

Once the timing option is considered, the effect of unanticipated deferral is more significant. The timing option operates through its differential effect on losses and gains. For instance, in Example 3A the tax benefit of a loss on the bet is $5.21 while (in present value terms) the tax cost of a win on the bet is only $4.31. The expected tax payment

\[
53. \quad \frac{\text{after-tax present value}}{= \frac{12.15}{(1 + .10)}
\]

54. The after-tax value is determined by discounting at the 10% discount rate her payments (refunds) of tax and her receipts (payments) on the bet. It assumes that a tax would be payable immediately on the gain (loss) and at one-year intervals thereafter. The following table shows the value of the contract at each period—assuming a win—and the resulting tax liability.

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
<th>Income</th>
<th>Tax Liability</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$17.36</td>
<td>$17.36</td>
<td>$5.21</td>
</tr>
<tr>
<td>1</td>
<td>19.09</td>
<td>1.73</td>
<td>0.52</td>
</tr>
<tr>
<td>2</td>
<td>21.00</td>
<td>1.91</td>
<td>0.57</td>
</tr>
</tbody>
</table>

The after-tax present value of the contract is the present value of the payment under the contract minus the present value of the tax liabilities. Thus, under a full accrual system the after-tax present value would be:

\[
55. \quad \frac{11.20}{= \frac{17.36}{(1 + .10)} - \frac{5.21}{(1 + .10)} - \frac{0.52}{(1 + .10)^2}}
\]

56. The demand for risky transactions will depend on the level of risk aversion and the correlation between the risks in the transaction and other risks in the economy. To the extent that a particular risky transaction can be used to hedge other risks, entering into such transactions may lower the overall level of risk in the economy.

57. See supra text accompanying notes 37-39 (noting that a taxpayer will have an incentive to accelerate losses but defer gains).

58. See supra note 40. These amounts are the tax benefit and cost of the loss or gain at the time of the coin toss. Because the payment is deferred, there will be additional gain if the bet is held to maturity and, consequently, additional tax cost. Similarly, there will be additional interest expense if the loss is funded out of borrowing.
is, therefore, $-0.45. 59 Absent taxes the expected value of the bet is zero. With taxes, the expected value of the bet is $0.45, the tax savings. Note that $0.45 is the expected value to each side of the bet. What has started out as a zero-sum game has become a positive-sum game, with the fisc providing the ante. The availability of the timing option is equivalent to a direct subsidy for such activities and, in general, leads to an inefficiently large amount of investment in activities that provide a timing option. 60

The value of the timing option increases with the variance in the return on the transaction, that is, with risk. Obviously, if there is no variance in the return, any deferral is fully anticipated and there is no timing option. As the variance increases, the potential gain and the resulting deferral increase, and, therefore, the value of the timing option increases. 61 A timing option, therefore, increases investment in risky activities. 62

The value of the timing option also increases with the ratio between the maximum holding period of the investment given a gain and the minimum holding period given a loss. 63 For instance, in Example 2 there is no time between the determination of the amount of gain or loss (the coin toss) and the necessary realization of any gain (the payment under the transaction). Accordingly, there is no timing option. On the other hand, in Example 2A there is a two-year period between the coin toss and the payment, permitting a two-year difference between gains and losses. Thus, the timing option encourages investment in transactions in which gains can be held for long periods of time while losses can be realized quickly.

The efficiency consequences of permitting straddle transactions derive primarily from the transaction costs of the straddle transactions. Since the essence of a straddle transaction is a perfectly balanced position, a straddle involves no net investment and no risk. Thus, straddles will not

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59. $-0.45 = (4.31 - 5.21) \times .50$ chance.
61. The relationship between the value of the timing option and risk is equivalent to the fact that, all else equal, the value of an option increases with the variance in the underlying prices. See John C. Cox & Mark Rubinstein, Options Markets 217, 219 (1985).
62. Of course, there are other aspects of tax law, such as the lack of refundability of losses and the capital loss limitation, that tend to discourage investment in risky assets. See, e.g., Graetz, supra note 49, at 678 (1988) (arguing that "[t]he limitations on the deduction of capital losses ... actually discourages risky investments"). It is unclear whether the net effect of the tax code is to encourage or discourage risk.
63. For example, a gain on a three-month cash-settlement forward contract can be deferred for at most three months, while the gain on a long position in stock can be held open indefinitely. Deferring the payment of taxes on gains for extended periods of time will increase the value of the timing option to the extent that losses may be recognized without deferral.
generally have the effect of encouraging misallocation of resources by virtue of the substance of the transactions. Nevertheless, substantial resources may be expended in promoting, entering into, and managing straddle transactions. Additionally, by reducing tax revenues, straddles require additional taxes to be levied on other transactions. Such replacement taxes will generate additional inefficiencies. Thus, although the direct efficiency costs of straddles are small, the indirect costs are significant.

E. Equity Consequences

Deferral has significant equity as well as efficiency consequences. In general, the seriousness of the consequences will depend on the extent to which market prices respond to the presence of deferral.

Consider first anticipated deferral, and assume that market prices have not responded to the deferral. In other words, assume that the pre-tax yield on the investment with deferral is equal to the pre-tax yield on a similar investment without deferral. Without price adjustment the deferral will, as discussed above, lead to a lower effective tax rate and a higher after-tax rate of return to holders of investments with deferral as compared to holders of similar investments without deferral. The divergence between economic income and taxable income has both horizontal and vertical equity consequences. Principles of horizontal equity are violated because taxpayers with equal economic income and thus presumably equal ability to pay are taxed differently depending on whether the income is derived from financial instruments that have anticipated deferral or from other sources that are not tax-favored. Principles of vertical equity are violated to the extent that such instruments are not evenly distributed.

64. As part of the Economic Recovery Tax Act of 1981, Pub. L. No. 97-34, 95 Stat. 172 (codified as amended in scattered sections of 26 U.S.C.), Congress has enacted a series of provisions intended to reduce the availability of tax straddles. These provisions include: I.R.C. § 263(g) (1988) (allowing no deduction for interest and carrying charges of a straddle); id. § 1092(a)(2) (allowing loss deferral when one leg of a straddle is disposed of); id. § 1256 (using mark-to-market accounting for certain contracts); see also infra text accompanying notes 161-75 (describing the current restrictions on tax straddles). At the time of the legislation, the Joint Committee on Taxation estimated that the revenue gain from the entire package of tax straddle rules was approximately $2.4 billion for the period June 23, 1981 through December 31, 1986. Staff of Joint Comm. on Taxation, 97th Cong., 1st Sess., General Explanation of the Economic Recovery Tax Act of 1981, at 381 (Comm. Print 1981) (Table: Summary of Estimated Revenue Effects of the Economic Recovery Act of 1981 (H.R. 4242), Calendar Years 1981-1986). The revenue estimate for fiscal years 1981 through 1986 was approximately $1.7 billion. Id. at 380 (Table: Summary of Estimated Revenue Effects of the Economic Recovery Act of 1981 (H.R. 4242), Fiscal Years 1981-1986). David Burnham estimates that commodity tax straddles were costing the government $3 to $4 billion a year in lost revenue. David Burnham, A Law Unto Itself: Power, Politics, and the IRS 214 (1989).

65. See Graetz, supra note 48, at 17 (describing horizontal equity as treating equally those with equal ability to pay).
throughout income classes.\textsuperscript{66} Even without considering the bias introduced by preferential taxation, it would seem reasonable to assume that higher income individuals are likely to receive a greater proportion of their income from financial instruments than are lower income individuals.

The foregoing assumes that markets have not adjusted to the existence of the anticipated deferral. The analysis changes dramatically if the market has adjusted to take into account the benefit of deferral. Assume that the entire tax benefit has been capitalized into the price of the investment.\textsuperscript{67} In that case, the after-tax yield on the investment is the same as the after-tax yield on alternative investments without anticipated deferral.\textsuperscript{68} Accordingly, a holder of the tax-favored instrument is, on an after-tax basis, treated no better than a holder of an instrument that is not tax-favored, and, consequently, there is no violation of equity considerations.\textsuperscript{69} In summary, the degree of inequity that flows from anticipated deferral depends on the degree to which the market is able to adjust to the existence of the deferral.\textsuperscript{70}

The equity implications of unanticipated deferral are different from those of anticipated deferral. To begin with, consider the effect of unanticipated deferral in the absence of the timing option. Unanticipated deferral differs from anticipated deferral in that the expected value of the deferral is zero.\textsuperscript{71} As a result, the market price cannot adjust to reflect the deferral.\textsuperscript{72} Accordingly, the market cannot be relied on to reduce

\textsuperscript{66} See id. (describing vertical equity as a concern for fairness requiring persons with greater ability to pay higher taxes).

\textsuperscript{67} See supra note 48 for a general discussion of the capitalization of tax benefits.

\textsuperscript{68} Note that the capitalization of tax deferral into the price of the instrument compensates the party to the transaction with the expected loss as well as imposing an implicit tax on the party to the transaction with the expected income. The amount of the compensation will be correct only if the holder faces the same tax rate that is implicit in the market capitalization. For a general discussion of the market's ability to impose a substitute tax on parties to transactions with expected deferral, see Daniel I. Halperin, Interest in Disguise: Taxing the "Time Value of Money," 95 YALE L.J. 506 (1986).

\textsuperscript{69} While there may be no actual benefit to the holder of the tax-favored instrument, there may be an appearance of a benefit that may be as destructive to the tax system as an actual benefit. Id. at 511 n.21.

\textsuperscript{70} The degree to which the market will actually adjust is a complex question turning on a variety of factors, including the relative importance of taxable and non-taxable players in the market. To the extent that all market participants were taxable at the same rate, it would be surprising if the market did not quickly adjust. To the extent that there are significant market participants, both on the demand and supply side, who have lower or zero tax rates, the degree of adjustment becomes much more uncertain.

\textsuperscript{71} See supra text accompanying notes 50-56 (explaining that unanticipated deferral increases the variance in the expected returns from an instrument but does not add value to the instrument when it is executed).

\textsuperscript{72} It is possible that the market will adjust somewhat to reflect the increased after-tax risk inherent in the transactions. It is difficult, however, to predict the direction of any such adjustment. See supra note 56 and accompanying text (arguing that unanticipated deferral increases the variance of outcomes, which increases the risk of the transaction, but that it is unclear how the market will adjust
inequity. On the other hand, because the expected value of deferral is zero, the expected tax rate on the income (or loss) is the same as the statutory rate. Accordingly, on an ex ante basis, no equity concern is raised.73 On an ex post basis, however, the holder of an instrument with unanticipated deferral is taxed at an effective rate less than the statutory rate.74 The question is then raised whether we should be concerned with ex post fairness or only ex ante fairness. In the extreme, it is unlikely that we would be content with a system where ex post effective tax rates diverged vastly from ex ante rates. For example, consider a tax system where all investments in corporate stock were taxed based on the average yield of all corporate stock, rather than on the actual performance of the taxpayer's stock holding. While such a system is arguably fair on an ex ante basis, it is unlikely that it would be thought of as acceptable from an equity point of view.75 Assuming this intuition is correct, it would suggest that we tend to think of equity more on an ex post basis than an ex ante basis.76

73. As a practical matter, even if the sole policy concern is ex ante fairness, a policy of current taxation of gains or losses, whether anticipated or unanticipated, is likely to enhance fairness because it will capture instances of anticipated gain or loss that have been misclassified as unanticipated gain or loss.

74. In the case of a deferred gain, the holder is undertaxed, and in the case of a deferred loss, the holder is overtaxed. In either case, the problem is that the effective rate is too low.

75. The system would be unfair on an ex post basis because although each taxpayer would be taxed on the same amount (the average yield of all corporate stock), the system would fail to account for inevitable differences in the gains or losses of each taxpayer's portfolio. As described, such a system would also be unfair on an ex ante basis because it would fail to take into account the relative risk of different corporations. One can imagine, however, correcting the proposed system to account for risk. Even such a corrected approach is unlikely to be perceived as fair.

76. Professor Michael J. Graetz, in discussing a possible consumption tax, has argued strenuously that equity must be viewed on an ex post basis:

[An ex ante approach to taxation requires a major restructuring of the classic conceptions of tax equity. Horizontal equity, the most widely accepted notion of fairness in taxation, requires that persons in similar circumstances pay similar amounts of tax. Although the tax literature is replete with disputes over whether "similar" or "different" circumstances are being compared, the notion that similar circumstances should be evaluated ex ante in present value terms seems quite a radical departure. Regardless of the precise contours of the definition of income or consumption, it seems clear that horizontal equity must be an ex post concept. Circumstances should be considered as similar only after results are known; lucky gamblers are not the same as unlucky gamblers.

An ex ante approach is even more troubling with reference to the vertical, equity criterion. . . . Certainly, if one accepts a vertical equity criterion which relates the distribution of the tax burden to "ability to pay," an ex post rather than ex ante circumstances would be relevant.

Graetz, supra note 4, at 1600-01 (footnotes omitted).

One could, however, argue the other way. For example, as a matter of horizontal equity, consider two persons each of whom was permitted to choose a certain salary of $50,000 or a risky salary of either $20,000 or $80,000, depending on the profitability of the business. It could be argued...}
In summary, unanticipated deferral generally produces a timing option that raises additional equity concerns. The existence of the timing option alters the nature of unanticipated deferral. Absent the timing option, the expected tax benefit of unanticipated deferral is zero. Given the timing option, however, the expected value of unanticipated deferral is positive.\footnote{Strnad offers a computation of the effect of the timing option on asset values. See Strnad, \textit{supra} note 6, at 1883 (providing a table of marginal tax rates and corresponding calculated "proportion[s] of asset value attributable to timing option").} Moreover, it is positive for both sides of the transaction. As a result, in general, the market price will not reflect the tax benefit.\footnote{To the extent that the benefit to one side of the transaction is capitalized in the price of the transaction, the benefit to the other side of the transaction is increased. Moreover, the benefit to the other side of the transaction becomes one of anticipated deferral, not just the timing option. To see this outcome, consider a minor variant on Example 2A. In Example 2A, Diva promises to pay David \$121 in exchange for a 50-50 chance at either \$100 or \$142. If Diva was forced to pay, for example, \$125 to reflect the benefit of the timing option, the expected value of the payoff to David would be \$4, instead of zero. Thus, David would have income at the time the bet was entered into of approximately} Therefore, the that given their equality of opportunity, it is fair to demand an equal contribution to the federal government.

The current Code takes a mixed approach. The basic rule is that income is determined on an ex post basis. Thus, for example, individuals are taxed on actual salary, not on some average or expected salary. On the other hand, income on zero-coupon bonds is taxed on an expected basis, with a catch-up (in nominal, but not present value, terms) at maturity. I.R.C. §§ 1271-1274 (1988).

Congress has recently considered expected versus actual outcomes in the area of annuities. Under § 72, each payment under an annuity is divided into a portion representing income and a portion representing a non-taxable return of capital using a fixed ratio based on the expected life of an annuitant. I.R.C. § 72(b) (1988). Until 1986, an annuitant who lived longer than expected continued to exclude a fixed portion of the annuity despite the fact that she had already recovered her entire investment in the contract. On the other hand, an annuitant who died prematurely was not permitted to take a loss for her unrecovered basis. Thus, annuitants recovered their capital correctly (in total amount, not as a timing matter) on an ex ante or expected basis, but not on an ex post or actual basis.

As part of the Tax Reform Act of 1986, § 72 was amended to provide that an annuitant who died prematurely could take a loss equal to her unrecovered basis and an annuitant who lived longer than expected could no longer recover more than her initial investment. See Tax Reform Act of 1986, Pub. L. No. 99-514, § 1122(c)(2), 100 Stat. 2467. With some apparent irony, Professor Graetz has suggested that the change was undesirable. Graetz, \textit{supra} note 48, at 210 ("It is extremely difficult to discern any good reason for this 1986 change in policy.").

In contrast to annuities, term life insurance is taxed approximately correctly on an ex ante basis, but incorrectly on an ex post basis. In general, term life insurance premiums are non-deductible, and the proceeds of term life insurance are not included in income. I.R.C. § 101(a)(1) (1988). Assuming that the expected payment under a term life contract is equal to the premiums, the current system of taxation is essentially equivalent to permitting a deduction for the premiums and including as an offsetting amount the expected payment under the policy, which is correct on an ex ante basis. On the other hand, after the expiration of the term of the insurance, the policy holder has either survived or not. If he has survived, he should be entitled to a deduction for the premiums paid. If he has not, he (or his estate or beneficiary) should be taxed on the net insurance proceeds. Thus, the current taxation of term insurance is consistent with an ex ante, but not with an ex post approach. Of course, it is easy to justify the exclusion of life insurance proceeds from income for reasons other than the non-deductibility of premiums—sympathy for widows and orphans ranks high on the list.

\footnote{Strnad offers a computation of the effect of the timing option on asset values. See Strnad, \textit{supra} note 6, at 1883 (providing a table of marginal tax rates and corresponding calculated "proportion[s] of asset value attributable to timing option").}
timing option raises questions of ex ante equity because certain types of income are treated more favorably than others on an expected value basis. 79

As an ex post matter, the equity consequences turn on whether the holder of the instrument is a loser or a winner. If she is a loser, she will realize her loss immediately and be taxed at the statutory rate on the loss. If she is a winner (i.e., she has a gain on the transaction), she will choose to defer the gain and secure the value of the deferral. In other words, a loser will be taxed correctly on the loss; a winner will be undertaxed on the gain.

Of the problems with deferral discussed above, the most serious horizontal and vertical equity concerns are raised by straddles. 80 Pure deferral and the timing option merely reduce the effective rate of tax on the specific transaction, but straddles permit deferral of taxation on unrelated income. 81

$3.31 (the present value of $4). Under a pure realization approach, however, David would not be taxed on that income until the time of the payoff. Thus, David would have: (1) the advantage of the timing option on the basic bet; (2) an additional receipt of $4; and (3) deferral of the tax due on the receipt of the $4.

79. Note that a system of pure ex ante taxation (with no correction upon realization) would eliminate the timing option and tax straddles. Even conceding that equity should generally be viewed on an ex post basis, it is theoretically possible that the advantages of pure ex ante taxation would outweigh the equity advantage of ex post taxation. It is unlikely, however, that in most contexts a pure ex ante approach would be politically or administratively acceptable. In particular, a pure ex ante approach places too much reliance on estimates of future income that are inherently unreliable and subject to abuse outside of narrow contexts like annuities and life insurance. See supra note 76 (discussing conceptions of equity under ex ante and ex post approaches for annuities and life insurance).

80. This statement is meant to cover only deviations from a full accrual system that are discussed in this Article. There are other provisions in the tax law that raise equally serious equity concerns. For example, the step up in basis at death, I.R.C. § 1014 (1988), has long been cited as one of the most serious loopholes in the tax code. See, e.g., SIMONS, supra note 5, at 212 (proposing that gain should be taxed at death). While Simons recognized the importance of taxing gains at death, he did not recognize the importance of loss limitations to deal with the timing option and straddles. See id. ("Full deduction should be allowed for all realized capital losses ..." (emphasis in original)).

In addition, the most serious distortions often come from a combination of provisions. For example, in a pure realization system with perfect capital markets, the combination of deferral on capital gains, a current interest deduction, and the step up in basis at death can be used to insure that no taxes are paid on any income. See Stiglitz, Some Aspects, supra note 37, at 262-65 (demonstrating how one can avoid paying any tax given the above conditions); see also Stiglitz, The General Theory, supra note 37, at 326-28 (discussing methods of tax avoidance). Strnad discusses the interaction of the timing option with the step up in basis at death. See Strnad, supra note 6, at 1883 n.191.

81. Any deviation from economic measurement of income arising from a transaction is magnified to the extent that the taxpayer is able to leverage her investment in the transaction. While this problem of tax arbitrage is beyond the scope of this Article, it should be noted that, to the extent that economic income is correctly measured, there is generally no need to restrict leverage or, more particularly, the interest deduction. Most of the Internal Revenue Code restrictions on the deductibility of interest arise out of the failure to tax economic income. The following chart offers some examples.
IV. The Treatment of Financial Instruments Under Current Law

In this Part, I discuss a variety of ways in which the current tax law deals with deferral and related problems.82

A. Restrictions on Anticipated Deferral

In the area of financial products, the tax law's response to deferral is varied and complex, and often differs depending, among other

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82. The following description of current law is not meant to be exhaustive either in the sense of covering all provisions of the federal income tax laws affecting deferral or in the sense of fully describing those provisions mentioned. Rather, the description is intended to illustrate the effect of deviations from a pure realization model on the problems discussed above. Additionally, by noting that a particular provision has the effect of restricting deferral, I do not necessarily mean to suggest that the drafters of the provision had such an intent, only that the provision has such an effect.

83. See, e.g., Halperin, supra note 68, at 519-24 (discussing deferred payments of compensation and the tax law's imposition of a matching requirement to prevent tax avoidance).
factors, on whether the deferral is anticipated or unanticipated and the extent to which the payments are certain or uncertain. Although it is difficult to generalize, to the extent that the payments are certain, the tax law often requires accrual of the expected income. Correspondingly, when the payment is uncertain, the tax law generally defers recognition at least until the time the uncertainty is resolved.

1. Treatment of Noncontingent Payments Under the OID Rules.—The primary example of the treatment of deferral with certainty is the treatment of debt instruments providing for fixed payments under the original issue discount ("OID") and related rules. Under these rules, the holder of an OID instrument is generally required to accrue income on

84. By certainty I am referring to the payments as determined under the terms of the relevant contract. I am not referring to credit risk. It is, of course, possible to view credit risk as creating a contingency in the same manner as a stated contingency, but generally this approach is not taken under current law. See, e.g., I.R.C. § 1273(a) (1988) (stating that the amount of original issue discount that must be accrued is based on the stated redemption price of maturity, which is defined by reference to the amount specified under the debt instrument, without regard to credit risk); Prop. Treas. Reg. § 1.1275-4(b)(1), 51 Fed. Reg. 12020, 12087 (1986) ("A payment under a debt instrument shall not be considered a contingent payment merely because the amount of or the liability for the payment may be impaired by insolvency or default."); I.R.C. § 585(c) (1988) (stating that large banks are not permitted a reserve for bad debts). But cf. I.R.C. § 163(e)(5) (Supp. II 1990) (denying creditors a deduction for a portion of the original issue discount on certain obligations with a yield in excess of the applicable federal rate plus five percentage points); I.R.C. § 585(a) (1988) (stating that small banks are permitted a bad debt reserve based on experience).

85. The term "expected income" is used loosely. At best, expectations will have to be based on objective market factors and will often have to be determined using significant approximations. As discussed below, a prime example of the requirement to accrue expected income is the original issue discount rules. More generally, accrual basis taxpayers are required to accrue expected receipts of income when such amounts can be determined with reasonable accuracy. See Treas. Reg. § 1.446-1(c)(1)(ii) (as amended in 1987) ("Generally, under an accrual method, income is to be included for the taxable year when all the events have occurred which fix the right to receive such income and the amount thereof can be determined with reasonable accuracy."); see also Treas. Reg. §§ 1.451-1(a) (as amended in 1978); 1.461-1(a)(2) (as amended in 1967).

86. A prime example of the failure to accrue uncertain expected income is the treatment of contingent interest under the OID rules. See infra section IV(A)(2). The generalizations in the text of this Article deal with the taxation of financial instruments, but this is not the only applicable area. See Halperin, supra note 68, at 519-24 (discussing the issue of deferral outside of the financial products area). In particular, Halperin shows how the tax code deals with the problem of deferred and accelerated payments through a combination of direct, indirect, and substitute taxation. See id. at 515-39 (analyzing accelerated payments, deferred payments, and premature accruals, and weighing the appropriateness of three methods accounting for this investment income: direct taxation by imputing interest, indirect taxation by denying an otherwise allowable deduction, and substitute taxation by denying a substitute party a deduction for interest).

a daily basis, and the issuer is required to accrue a corresponding item of expense. The amount to be accrued with respect to each period is determined under a constant yield methodology. Under this approach, a single yield is determined for the instrument, and income is presumed to accrue based on that yield.

For instance, in Example 1 where Diva pays David $100 today in exchange for $121 in two years, Diva would be required to accrue the $21 of income over the two-year period. In the example, the yield on the instrument is ten percent. Therefore, Diva would be required to accrue $10 in the first year and $11 in the second year.

The taxation of such an investment can be viewed as taxing expected income on the assumption that interest rates will remain constant throughout the life of the instrument. In other words, if interest rates remain constant at ten percent, the investment will be worth $110 in one year. Under a full accrual system, Diva would be taxed on the $10 increase in value. Thus, the OID rules are equivalent to a full accrual system under the constant yield assumption.

To the extent that interest rates change or otherwise diverge from the constant yield assumption, actual income will diverge from expected income as will the amount of income under the OID rules relative to a full accrual system. For example, assume that by the end of the first year the interest rate has dropped from ten percent to five percent. In that case, the value of the investment will be approximately $115 at the end of the first year. Diva will have earned $15 of income, not the $10 on which she is being taxed.

89. Id. § 163(e) (Supp. II 1990).
90. Id. § 1272(a)(3) (1988).
91. Assuming an annual accrual period, the yield may be determined by solving for \( r \) in the following equation:

\[
\frac{100}{(1+r)^2} = \frac{121}{100},
\]

so

\[
r = \sqrt{\frac{121}{100}} - 1 - 10\%.
\]

92. In the language of the OID rules, the issue price of the obligation would be $100 and the stated redemption price at maturity would be $121. See I.R.C. § 1273 (1988). There would therefore be $21 in original issue discount, and the yield to maturity would be 10%. See id. The OID for the first accrual period would be the issue price times the yield to maturity, or $10. The adjusted issue price would then be the issue price plus the OID for the accrual period, or $110. The OID for the second (and final) period would be the adjusted issue price times the yield, or $11.

93. More precisely, the OID rules are consistent with taxing expected income if, as of the time of issuance, there is a level yield curve over the relevant term and then, within that term, the yield curve is expected to remain constant. See infra text accompanying note 311.

94. Alternatively, if interest rates have increased to 15%, the value of the investment will be approximately $105 and the proper income accrual would be approximately $5.
Thus, even in the most basic case of debt instruments that provide for a predetermined fixed stream of payments, the OID rules tax on the basis of expected income, not actual income. As a result, in the case of noncontingent debt, the OID rules solve the problem of anticipated deferral, but do not solve the problems of unanticipated deferral and the timing option.

2. Treatment of Contingencies Under the OID Rules.—Where payments under a debt instrument are contingent, the OID rules are considerably less successful at accruing even expected income. Until recently, in the case of debt instruments issued for cash or publicly traded property, the contingent interest rules were divided into two parts. The first set of rules governed instruments under which the total noncontingent payments (regardless of whether designated as interest or principal) are equal to or greater than the overall issue price of the instrument (the “Paragraph (e)” rules). The second set of rules governed instruments under which the total noncontingent payments are less than the issue price (the “Paragraph (f)” rules).

Under the Paragraph (e) rules, an instrument is divided into its noncontingent and contingent parts. The noncontingent payments are then treated as a separate debt instrument with an issue price equal to the issue price of the overall debt instrument. The contingent payments are treated as interest in the taxable year in which they become fixed. In other words, none of the issue price is allocated to the contingent payments, thereby minimizing the amount of income accrued with respect to the noncontingent payments. At the same time, the contingent payments are not accrued until they become fixed.

95. Prop. Treas. Reg. § 1.1275-4(e)-(f), 51 Fed. Reg. 12022, 12090-94 (1986). The proposed regulations provide for an entirely different set of rules when the only contingency is that the interest payments are based on a qualified variable rate. Such variable rate debt instruments are essentially taxed on an expected value basis. See id. § 1.1275-5, 51 Fed. Reg. 12094 (1986) (providing rules for the treatment of variable interest payments); id. § 1.1275-4(b)(1), 51 Fed. Reg. 12087 (1986) (providing that qualified variable payments of interest are not treated as contingent payments). Where contingent debt instruments are issued for nonpublicly traded property, the instruments are governed by id. § 1.1275-4(c)-(d), 51 Fed. Reg. 12087-90 (1986).
97. Id. § 1.1275-4(f), 51 Fed. Reg. 12092-94 (1986). The differences between the Paragraph (e) and the Paragraph (f) rules are more apparent than real. In particular, in the case of a debt instrument where the noncontingent payments exactly equal the issue price of the instrument, both sets of rules give precisely the same pattern of income accruals.
100. Id. § 1.1275-4(e)(3)(i), 51 Fed. Reg. 12091 (1986). If the contingent payment has become fixed but is not due within six months, only the present value of the contingent payment is taken into income. Id. § 1.1275-4(e)(3)(ii), 51 Fed. Reg. 12091 (1986). See infra Appendix C for a further discussion of these rules.
Under Paragraph (f), the instrument is again divided into noncontingent and contingent payments, but the contingent payments are treated as a return of principal. As each contingent payment becomes fixed, it is treated first as interest to the extent that interest would have accrued on the instrument if it bore interest at the applicable federal rate and then as principal to the extent of any remaining payment.

The proposed contingent interest rules were recently modified to come closer to accruing expected income in certain circumstances (the "Paragraph (g)" rules). The Paragraph (g) rules apply to any debt instrument that (1) is issued for cash or publicly traded property; (2) provides for noncontingent payments equal to or greater than the issue price; and (3) provides for one or more contingent payments determined, in whole or in part, by reference to the value of publicly traded stock, securities, commodities, or other publicly traded property. Under Paragraph (g), as with Paragraph (e), the instrument is first divided into noncontingent and contingent payments, with the noncontingent payments being treated as a separate noncontingent debt instrument. Unlike under Paragraph (e), the issue price of the overall instrument is allocated between the noncontingent and contingent payments in proportion to their respective fair market values. Thus, at least with respect to the noncontingent part of the instrument, the correct amount of income is accrued. The contingent payments are then treated "in accordance with their economic substance as payments pursuant to one or more options or other property rights."

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102. Id. § 1.1275-4(f)(2), 51 Fed. Reg. 12092 (1986). The total amount treated as principal is limited to the issue price of the overall debt instrument. Once this limit has been reached, any remaining contingent payments are treated entirely as interest. The ordering rule is reversed for payments at maturity that are first treated as principal to the extent of unpaid principal and then treated as interest. If, at maturity, less than the entire issue price has been accounted for, the holder of the instrument is entitled to a loss to the extent of unrecovered principal. Id. § 1.1275-4(f)(3), 51 Fed. Reg. 12092-93 (1986).

As with the Paragraph (e) rules, if a contingent payment is to be paid more than six months after it becomes fixed, only the present value of the payment is taken into account when it becomes fixed. Id. § 1.1275-4(f)(2)(v), 51 Fed. Reg. 12092 (1986).

106. Id.

107. Id. § 1.1275-4(g)(4)(i), 56 Fed. Reg. 8311 (1991). One of the significant differences between the Paragraph (e) (and Paragraph (f)) rules and the Paragraph (g) rules is that under the former, a debt instrument is bifurcated solely for the purpose of determining the timing of income, while under the latter, the bifurcation applies for purposes of character as well as timing. See id. § 1.1275-4(g)(5), 56 Fed. Reg. 8311 (1991) (providing an example of the application of the Paragraph (g) rules). The question of character is more acute than it might have once been because of the Supreme Court's decision in Arkansas Best Corp. v. Commissioner, 485 U.S. 212 (1988). Prior to Arkansas Best, it is likely that, at least from the borrower's point of view, gain or loss would have been ordinary under
To see the difference between the Paragraph (e) and the Paragraph (g) rules, consider their application to Example 3. In Example 3, Diva pays David $100 today in exchange for David's promise to pay Diva $142 or $100 in two years, depending on the toss of a coin at that time. Assuming that the obligation would be treated as a debt instrument, it would be viewed as an obligation with a principal amount of $100 and contingent interest of either $0 or $42.\textsuperscript{108} Under Paragraph (e), the instrument would be bifurcated into a noncontingent and contingent instrument. The noncontingent instrument would have an issue price of $100 and a stated redemption price at maturity of $100 and, therefore, would be treated as having no original issue discount. As a result, no income would accrue and the $100 payment at maturity would be treated as a return of basis. With respect to the contingent payment, no income would accrue on the obligation until the amount of the contingency was fixed.\textsuperscript{109} Therefore, Diva would not be required to accrue any income until the end of the two years. At that time, if she won the coin toss she would take the $42 into income as interest, and if she lost the coin toss she would have no gain or loss.\textsuperscript{110} In general, when payments under a debt instrument are contingent, the Paragraph (e) rules fail to accrue expected income.\textsuperscript{111}

As an alternative, assume that the contingency in Example 3 is determined by reference to the value of publicly traded property and that, therefore, the Paragraph (g) rules apply. Under Paragraph (g), the $100 issue price of the debt instrument would be divided between the noncontingent and contingent components. An expansive reading of the Corn Products doctrine. See Corn Prods. Ref. Co. v. Commissioner, 350 U.S. 46, 50 (1955) (holding that the company's futures transactions "were vitally important to the company's business as a form of insurance against increases in ... price," so the gain and loss derived from them was ordinary). After Arkansas Best, it is far more likely that gain or loss would be capital. See Arkansas Best, 485 U.S. at 217 ("The broad definition of the term 'capital asset' explicitly makes irrelevant any consideration of the property's connection with the taxpayer's business . . . ."); see also Edward D. Kleinbard & Suzanne F. Greenberg, Business Hedging After Arkansas Best, 43 TAX L. REV. 393, 414-40 (1988) (comparing the decisions of Arkansas Best and Corn Products).

The magnitude of the problem from the issuer's point of view may, however, be overstated. If the issuer has fully hedged the risk on the imbedded derivative product using nonimbedded derivative products, any gain or loss on the imbedded derivative products will be offset by gain or loss on the nonimbedded derivative products. Accordingly, the character of the gain or loss will be irrelevant.

\textsuperscript{110} Id.
\textsuperscript{111} While in general the contingent interest rules defer expected income, there are instances where they accelerate expected income. In particular, when the contingency is resolved currently, but relates to future periods, the contingent interest rules accelerate the accrual of income. This point is discussed further in Appendix C.

While the OID rules do not generally require or permit accrual based on the expected amounts of contingent payments, the rules do provide for accrual based on the expected time of payments where the timing of such payments is uncertain. See infra Appendix C.
gent promise to pay $100 and the contingent promise to pay either $0 or $42. The fair market value of the right to receive $100 in two years is approximately $83\textsuperscript{112} and the fair market value of the right to receive the contingent payment is approximately $17.\textsuperscript{113} Therefore, the holder of the instrument would be treated as if she had paid $83 for the right to receive $100 in two years, plus $17 for the right to receive the contingent payment of $42. She would then be required to accrue $17 of original issue discount with respect to the noncontingent instrument.

The contingent instrument would be treated as an option with an issue price of $17 and a payoff of either $0 or $42. No accrual would be required with respect to this option.\textsuperscript{114} At maturity, if she received $142, she would have an additional $25 of income on the option, and if she received $100, she would have a loss of $17.\textsuperscript{115} Thus, under the Paragraph (g) rules some but not all of the expected income is required to be accrued.\textsuperscript{116}

3. Treatment of Anticipated Deferral Outside the OID Rules.—In the case of financial products not covered by the OID rules, taxpayers are generally not required to accrue expected income because taxation of the products is governed by the realization requirement.\textsuperscript{117} For example, in the case of an option, neither the purchaser nor the seller of the option has income prior to the exercise or expiration of the option.\textsuperscript{118} This failure

\textsuperscript{112} $83 = \frac{100}{1 + \frac{10}{2}}.$

\textsuperscript{113} Assuming that there is an equal probability of receiving either $0 or $42, the future value of the right is $21. The present value is approximately $17.

\textsuperscript{114} See infra note 118 for a discussion of the treatment of an option.

\textsuperscript{115} Her loss would be equal to the amount of her basis allocated to the contingency.

\textsuperscript{116} Under the Paragraph (g) rules, she is required to accrue $17 of income. Her expected income over the term of the bet is $21. See supra text accompanying note 25.

\textsuperscript{117} See supra text accompanying notes 1-2.

\textsuperscript{118} In general, the purchaser of an option to purchase property (a call option) is required to capitalize the premium, thus resulting in no items of income or deduction from the initial purchase of the option. The purchaser is not required to accrue any income, nor is she permitted to accure any deductions while she holds the option. If the option expires worthless, she is permitted a loss at that time. If she exercises the option, she recognizes no gain or loss and takes a basis in the property purchased equal to the option premium plus the strike price (the price paid above the initial cost of the option). The seller of the option treats the initial receipt of a premium as an open transaction. If the option is later exercised, the premium, along with the strike price, is treated as part of the sale proceeds. If the option expires unexercised, the premium is taken into income at that time. See Virginia Iron Coal & Coke Co. v. Commissioner, 37 B.T.A. 195 (1937) (ruling that payments received under a call option, which were to be applied to the purchase price if the option were exercised and retained if the option were not, should be considered income in the year in which the option was surrendered), aff'd, 99 F.2d 919 (4th Cir. 1938), cert. denied, 307 U.S. 630 (1939).

Similarly, the premium paid by the purchaser of an option to sell property (a put option) is a nondeductible capital expense. If the put expires worthless, the payor is permitted a loss at that time. If the put is exercised, the premium is subtracted from the amount realized from the sale of the underlying property. The writer of the put does not include the premium received in income at the time.
to accrue expected income occurs even in the context of debt instruments (e.g., market discount\textsuperscript{119} and discount on short-term obligations\textsuperscript{120}) and debt equivalents (e.g., deferred annuities\textsuperscript{121}).

4. Alternatives to Accruing Expected Income.—Although substantial deferral is permitted due to the general failure of the tax system to accrue anticipated deferral, there are a variety of provisions that limit taxpayers' ability to exploit this failure.\textsuperscript{122} Many of these provisions operate by deferring interest deductions as a means of indirectly imputing income.\textsuperscript{123} The principal provision along these lines is section 163(d).\textsuperscript{124} Section 163(d) limits the deduction of investment interest to net investment income. Thus, for example, if a taxpayer makes a single debt-financed acquisition of an investment asset, the interest on the indebtedness will only be deductible to the extent that income is recognized with respect to that asset.
As an alternative to accruing income on investments, section 163(d) has a number of weaknesses.\textsuperscript{125} First, it operates on an aggregate, not on an asset-by-asset or a transaction-by-transaction basis. As a result, interest expense properly allocable to one investment may be used against income from a second investment.\textsuperscript{126} Second, section 163(d) operates only when investments are debt-financed; investments financed out of equity are not affected. Third, section 163(d) requires allocating interest expense to investments before the interest expense can be subject to disallowance.\textsuperscript{127} The regulations under section 163(d) provide for allocating interest expense according to use of the debt proceeds determined under a tracing approach.\textsuperscript{128} The allocation rules are administratively complex and easily circumvented.\textsuperscript{129} Fourth, section 163(d) applies only to individuals.\textsuperscript{130} Fifth, the provision is overly broad because it disallows interest expense in the case of a real economic loss.\textsuperscript{131} Finally, section 163(d) is overly narrow in that it operates by stacking interest expense first against realized income. For example, assume that a taxpayer with no other investments or debt has the opportunity to finance the acquisition of

\textsuperscript{125} Prior to the Tax Reform Act of 1986, § 163(d) was substantially weaker, permitting the deduction of up to $10,000 in investment interest expense over and above the amount of investment income. I.R.C. § 163(d)(1)(A)-(B) (1985), amended by I.R.C. § 163(d)(1) (1988).

\textsuperscript{126} Consider the following example. Rigel borrows $2000 at 10% and uses the proceeds to purchase two assets for $1000 each. The first asset is expected to appreciate by 10% per year, but to pay no current income. The second asset is expected to pay 10% current income.

Assuming that both assets perform as expected, § 163(d) works properly. Rigel has gross economic income in the first year of $200, $100 from each asset, and interest expense of $200. Her net economic income is, therefore, zero. Absent § 163(d), however, her gross taxable income would be only $100 (from the current asset), and her taxable income would be $-100. Under § 163(d), her $200 of investment interest would only be allowed to the extent of investment income, or $100, and her taxable income would be zero.

If, however, the current asset performs better than expected, § 163(d) does not work properly. For example, assume that the current asset generates income of $200 in the first year. Rigel now has investment income at least equal to her investment interest and § 163(d) would not act to disallow any of the investment interest. In other words, the income from the current asset is being used to offset the interest expense of the deferred asset.

Additionally, § 163(d) does not work properly if the deferred asset performs better than expected. Assume the deferred asset grows at 20% per year. In that case, Rigel would have economic income of $100 ($200 + $100 - $200) and taxable income of zero.


\textsuperscript{131} For example, assume that the taxpayer makes a debt-financed purchase of stock and has no other debt or investments. Assume that the stock pays no dividends and after one year is sold for its purchase price and the proceeds are used to retire the debt. Under § 163(d), the entire interest expense on the debt would be disallowed, despite the fact that there was no deferral of income.
an investment with debt. Assume that the interest rate on the debt is ten percent and the yield on the investment is twelve percent, of which ten percent is paid currently and two percent is deferred. Under these circumstances, section 163(d) would not limit the taxpayer’s interest deduction at all, because the ten percent current interest expense would be stacked first against the ten percent current income from the investment and would, therefore, be fully deductible.

While it is easy to point out the flaws in section 163(d), it is not so easy to suggest remedies. For example, stacking investment interest expense first against deferred income would require measuring the amount of deferred income. Once deferred income is measured, it is hard to justify not taking the additional step of taxing the deferred income on a current basis. At that point, however, section 163(d) becomes totally unnecessary and should be repealed rather than merely modified.

In addition to section 163(d), there are a variety of interest deferral and disallowance provisions that operate only with respect to certain classes of deferred income. For example, section 1277 defers the deduction of certain interest payments on obligations incurred or continued to purchase or carry market discount bonds. The principal weakness in such provisions is the difficulty of allocating interest to particular investments. As a result, such provisions tend to have limited application, serving mostly to prevent the marketing of tax shelters.

5. Restrictions on the Timing Option.—There are a variety of provisions in the tax law that restrict taxpayers’ ability to take advantage of the timing option by deferring or disallowing losses or other deductions. These provisions include, among others, the capital loss limitation, the

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132. I.R.C. § 1277 (1988). Other examples include § 1282, which requires the deferral of interest expense allocable to short-term debt instruments with acquisition discount, and § 264(a)(2), which denies an interest deduction with respect to indebtedness incurred or continued to purchase or carry a single-premium life insurance, endowment, or annuity contract. See id. § 1282; id. § 264(a)(2).

133. Such provisions share other weaknesses associated with § 163(d). For example, they have no effect where the investment is financed out of equity. See, e.g., I.R.C. § 1277 (1988) (requiring deferral of interest deduction allocable to accrued market discount); id. § 1282 (requiring deferral of interest deduction allocable to accrued discount on short-term obligations). These provisions also permit interest expense to be allocated against current income and thereby deducted before deferred income. While this aspect is probably necessary in the case of § 163(d) because of the difficulty in measuring the deferred income, it is harder to justify in the case of § 1277 and § 1282 because the amount of deferred income is presumed to be known.

wash sale rules, restrictions on losses on sales to related parties, and the requirement of economic performance.

The principal limitation on the timing option is the capital loss limitation, which generally limits the deductibility of capital losses to the amount of realized capital gains. The capital loss limitation serves as a broad overall constraint on taxpayers' ability to utilize the timing option. The limitation is, however, both overinclusive and underinclusive. It is overinclusive because it does not permit taxpayers to utilize losses whose timing has not been affected by the timing option. The limitation is underinclusive because, if the taxpayer has other capital gains, it permits those gains to offset accelerated losses.

Another major weakness of the capital loss limitation is that it is limited to losses from sales or exchanges of capital assets. This restriction causes two problems. First, it relies on the existence of a sale or exchange, leaving open the possibility that taxpayers will claim that the loss has been realized without such a sale or exchange, such as through the extinguishment of a contract. More importantly, the capital loss

135. Id. § 1091.
136. Id. § 267.
137. Id. § 461(h).
138. See Strand, supra note 6, at 1886 (describing the capital loss limitation as a restriction on the timing option). In the case of a corporation, § 1211(a) allows capital losses only to the extent of capital gains. Id. § 1211(a). Section 1212(a) permits a three-year carryback and a five-year carryforward of unused losses. Id. § 1212(a). In the case of noncorporate taxpayers, § 1211(b) permits up to $3,000 in capital losses over and above the amount of capital gains. Id. § 1211(b). Section 1212(b) permits an unlimited carryforward of unused losses. Id. § 1212(b). For a discussion of the importance of the capital loss limitation to the overall integrity of the tax code, see Stiglitz, Some Aspects, supra note 37, at 268-70; Stiglitz, The General Theory, supra note 37, at 326-29 (both describing various tax avoidance schemes and noting that the capital loss limitation restricts a taxpayer's ability to implement these strategies).
139. Consider, for example, the purchase of a six-month cash-settlement option to purchase gold that expires worthless at the end of the period. Since any gain on the option would have to be recognized no later than the end of the six-month period, the taxpayer is not benefiting from the timing option if he is permitted to recognize the loss at the expiration of the option. Of course, if he sells the option at a loss prior to the end of the six months, it would be reasonable to defer his loss until the end of the option period. At that point, concern over the timing option does not justify further deferral of his loss. Strand, for example, suggests limiting the capital loss limitation to assets that may be held for long periods of time. Strand, supra note 6, at 1888.
140. See id. (arguing that low-risk assets will produce capital gains that can be used to offset capital losses on high-risk assets); see also Michael C. Durst, Inflation and the Tax Code: Guidelines for Policymaking, 73 MINN. L. REV. 1217, 1228 n.24 (1989) (noting that § 1211 and § 1212 "do not wholly eliminate the advantages that taxpayers can enjoy by pursuing a policy of realizing losses currently but deferring gains indefinitely").
142. See, e.g., Fairbanks v. U.S., 306 U.S. 436 (1939) (holding that redemption of corporate bonds is not a sale or exchange); Commissioner v. Starr Bros., 204 F.2d 673, 674 (2d Cir. 1953) (holding that a manufacturer's payment to a dealer in exchange for extinguishment of their exclusive agency contract was not a sale or exchange of a good); Rev. Rul. 56-531, 1956-2 C.B. 983 (stating that the relinquishment of simple contract rights and the release of certain leasehold interests in real property
limitation relies on the definition of a capital asset. Unfortunately, the definition of "capital asset" is forced to serve two different functions. First, it delineates those gains and losses netted for capital loss limitation purposes. Second, it identifies those assets potentially eligible for favorable capital gains taxation. This need to serve two distinct purposes has made the search for a capital gains definition much more difficult and the realization of an ultimately satisfactory solution unlikely.

While the capital loss limitation deals with the timing option with a broad brush, a number of other provisions deal with more specific abuses of the timing option. One such type of abuse occurs when the taxpayer has disposed of the property as a legal matter, but maintains an economic interest in the property. For example, section 267 generally disallows any deduction for losses from the sale or exchange of property between related persons. One justification for this provision is that there has been an insufficient disposition of the property. While the taxpayer has divested herself of legal ownership, she is presumed to still have equitable ownership—or at least control—of the property. Similarly, the wash
sale rules limit the ability of taxpayers to take losses while maintaining an interest in the same or similar property. As with disallowance of losses on sales to related parties, the wash sale rules can be justified on the basis of a concern for the substance over the form of the transaction. In a wash sale, the taxpayer has not, in substance, disposed of the property. Therefore, no realization event sufficient to trigger a loss has occurred.

Section 461(h) provides yet another limitation on a taxpayer’s ability to take advantage of the timing option. In general, under the accrual method of accounting, a taxpayer is entitled to deduct an expense when all the events have occurred that establish the fact of the liability giving rise to such deduction and the amount thereof can be determined with reasonable accuracy. Thus, for example, if the loser of the bet described in Example 2A employs an accrual method of accounting, she would be permitted to deduct the loss for the taxable year in which the coin is tossed, rather than having to wait for the year of payment. Moreover, she would be permitted to take the deduction without regard to a realization event.

pressure off monitoring such transactions.

148. In general, § 1091, the wash sale provision, disallows the loss from the sale or other disposition of stock or securities if within 30 days before or after the date of such disposition the taxpayer acquires, or enters into a contract or option to so acquire, substantially identical stock or securities. See I.R.C. § 1091 (1988).

149. One significant difference between the related party and the wash sale rules is that in the former, the loss may be permanently disallowed, while in the latter, the loss is merely deferred. Compare I.R.C. § 267(d) (1988) (reducing future gain, but not increasing future loss, by the amount of any disallowed loss from a related party transaction) with id. § 1091(d) (stating that the basis of property subject to the wash sale rules is increased or decreased by the difference between the price at which the property was acquired and the price at which substantially identical property was sold).

150. Treas. Reg. § 1.461-l(a)(2) (as amended in 1967). This determination is made under the rubric of the “all events test.” Treas. Reg. § 1.446-l(c)(1)(ii) (as amended in 1987).

151. See supra text accompanying note 28.

152. The amount of the deduction would be the face amount of the liability ($21), not its present value (approximately $17).

153. Cf. Mooney Aircraft, Inc. v. United States, 420 F.2d 400, 409-10 (5th Cir. 1969) (disallowing a deduction for a future expense that meets the all events test on the ground that permitting the deduction would not clearly reflect income within the meaning of I.R.C. § 446(b)). The flip side of the rules for accruing deductions are the rules for accruing income. Under Treas. Reg. § 1.446-l(c)(1)(ii), “income is to be included for the taxable year when all the events have occurred which fix the right to receive such income and the amount thereof can be determined with reasonable accuracy.” Treas. Reg. § 1.446-l(c)(1)(ii) (as amended in 1987).

Because the accrual rules require the face amount, rather than the present value, of an item of income or expense to be accrued, the accrual rules can have the effect of accelerating income and expense. The principal opportunity for abuse comes from taxpayers’ ability to organize their affairs so that items of deduction will tend to be accrued prior to items of income. See generally Mooney Aircraft, 420 F.2d at 410; Daniel I. Halperin & William A. Klein, Tax Accounting for Future Obligations: Basic Principles Revised, 38 TAX NOTES 831, 832 (Feb. 22, 1988); William A. Klein, Tax Accounting for Future Obligations: Basic Principles, 36 TAX NOTES 623, 627-28 (Aug. 10, 1987), Halperin, supra note 68, at 523-34.
Section 461(h), however, adds the requirement of "economic performance" to the all events test. Under the regulations, if the liability of a taxpayer is to provide, inter alia, an award, prize, jackpot, or other similar payment to another person, economic performance occurs as payment is made to the person to whom the liability is owed. Thus, under section 461(h) the loss would not be deductible prior to the end of the two-year period of the bet even if the loser were to pay a third party to take over the liability.

The latest weapon in the Internal Revenue Service's arsenal of devices designed to combat the timing option is the treatment of termination payments under the proposed notional principal contract regulations. A party wishing to terminate a notional principal contract has two choices. She can negotiate with her counterparty for a termination, or she can assign her rights and obligations under the contract to a third party. Where the two parties to a notional principal contract agree to terminate the contract in exchange for a termination payment by one party to the other, the proposed regulations provide the unremarkable rule that the termination payment is recognized by both parties in the year of termination. The rule is, of course, merely a restatement of the realization requirement.

The more remarkable rule is the one dealing with an assignment. If a party to a notional principal contract assigns her contract to a third party in exchange for a termination payment (in either direction), the termination payment must be recognized by both of the original parties in the year of payment. Therefore, the assigning party is unable to...
recognize a loss without triggering gain recognition by her counterparty. If both parties face the same tax rate on gains and losses from the contract, the timing option effectively disappears. 160

B. Restrictions on Tax Straddles

Given well-developed markets, straddles represent one of the most serious threats to the integrity of a realization-based system. 161 The primary responses to the problem of straddles were the enactment of the straddle rules 162 and the mark-to-market rules. 163

As discussed above, a straddle consists of two positions whose values are expected to change in equal but opposite amounts. 164 For example, a straddle can be created by simultaneously entering into a forward contract to buy gold at $400 per ounce and a forward contract to sell gold at $400 per ounce with the same maturity. As long as the price of gold either rises or falls, one of the positions will fall in value and the other will rise. The loss position can then be disposed of in the current tax year while the gain position can be held and disposed of in a future tax year. 165 The straddle rules attack straddle transactions by deferring recognition of any realized loss on the straddle to the extent of any unrecognized gain. 166 The straddle rules are, of course, unnecessary to the extent that the loss would be a capital loss actually restricted by the capital loss limitation. 167 By deferring losses if and only if there is unrecognized gain, the straddle rules represent a more precise and effective approach to straddles than does the capital loss limitation. This precision, however, necessarily comes at the expense of administrative complexity. The operation of the capital loss limitation requires looking only at recognized gains and losses. The straddle rules, on the other hand, require the identification of a


160. Of course, if the counterparty is tax-exempt, neither termination rule works to restrict the timing option. Similarly, if the counterparty has elected to be taxed under a mark-to-market approach, the timing option remains available. See id. § 1.446-4(a), 56 Fed. Reg. 31361 (1991) (detailing criteria for mark-to-market election); see also infra note 223 (describing the value of the timing option when one party is indifferent to the occurrence of a realization event).

161. See supra note 64 and accompanying text (describing the billions of dollars lost by the Treasury due to the costs of tax straddles).


163. Id. § 1256.

164. See supra subpart III(C).

165. Once the loss position is disposed of, the straddle is, of course, destroyed, and the taxpayer is subject to real gains and losses on the remaining position. The taxpayer can, however, protect against such losses by entering into a new offsetting position.


167. See supra text accompanying note 138.
specific straddle and measurement of the amount of unrecognized gain in the remaining leg of the straddle.168

While the straddle rules are an effective means of limiting the timing option in the case of straddles, it should be emphasized again that the timing option exists whether or not there is a straddle. The essence of the straddle problem is the ability to take advantage of the timing option without the assumption of economic risk.169 If the taxpayer is willing to assume risk, the opportunity to take advantage of the timing option remains. For example, consider a taxpayer who invests in a diversified portfolio of risky assets, the returns on which are not perfectly correlated.170 It would seem clear that the portfolio is not a straddle within the meaning of section 1092.171 Any other result would have the effect of substantially broadening the straddle rules beyond their intended scope. Nevertheless, it is clear that the taxpayer expects, with a substantial degree

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168. See I.R.C. § 1092(a) (1988) (setting out the definition of “unrecognized gain” to be used to offset the loss leg of the straddle). The measurement of unrecognized gain implicitly requires marking the unrecognized leg to market. Thus, the straddle rules can be viewed as a partial mark-to-market rule. Under the straddle rules, gain on unrecognized legs is marked to market to the extent of recognized loss on the loss leg. This need to value the unrecognized leg of a straddle provides one justification for limiting the straddle rules to property for which there are active markets. In addition, an effective tax straddle requires the ability to dispose of the loss leg with relatively low transaction costs, which provides another justification for limiting the scope of the straddle rules to property for which there are active markets. The actual limitation in the statute is to “property of a type which is actively traded.” Id. § 1092(d)(1). The term “actively traded” has been interpreted so as not to require conventional markets. See Prop. Treas. Reg. §§ 1.1092(d)-1(b) to (c), 56 Fed. Reg. 31350, 31361-62 (1991) (stating that a notional principal contract is actively traded property if it is similar to contracts with respect to which dealers, brokers, or traders regularly disseminate price quotations).

169. For purposes of § 1092, a straddle requires the reduction, but not the elimination, of all risk. Section 1092 defines a straddle as offsetting positions with respect to personal property. I.R.C. § 1092(c)(1) (1988). Under § 1092(c)(2), a taxpayer holds offsetting positions with respect to personal property if there is a substantial diminution of the taxpayer’s risk of loss from any position by reason of his holding one or more other positions. Id. § 1092(c)(2).

Section 1092(c)(3) identifies a number of indicia of straddle transactions, any one of which establish a rebuttable presumption that a straddle exists. The indicia include: (1) the positions are in the same property (whether or not in a substantially altered form); (2) the positions are in debt instruments of a similar maturity; (3) the positions are sold or marketed as offsetting positions; and (4) the aggregate margin requirement for such positions is lower than the sum of the margin requirements for each such position if held separately. Id. § 1092(c)(3). Section 1092(c)(3)(vi) provides authority for the Treasury to issue regulations establishing additional subjective or objective presumptions.

170. Diversification can potentially eliminate unsystematic risk. Diversification will not reduce market risk. BREALEY & MYERS, supra note 18, at 137.

171. The Joint Committee explanation of the straddle provisions noted that:
Although the concept of offsetting positions is not narrowly defined in the statute, certain cases fall outside its scope. For example, risk reduction through mere diversification usually would not be considered to substantially diminish risk for purposes of this Act, if the positions are not balanced. Thus a taxpayer holding several types of securities but holding no short positions generally would not be considered to be holding offsetting positions.

STAFF OF JOINT COMM. ON TAXATION, supra note 64, at 288. Presumably the modifiers “usually” and “generally” were added out of an abundance of caution.
of certainty, that he will have both winners and losers in his portfolio and thus will be able to take losses currently while deferring gains.

It is only where the taxpayer has but a single investment, or a portfolio of perfectly correlated investments, that there is no straddle opportunity. Nevertheless, even in these limited circumstances, the timing option remains. In general, as long as the investment is risky in the sense that there is a chance of either a gain or a loss, the timing option exists and increases the expected return from the investment.

C. Comprehensive Solutions—Section 1256

The ultimate solution to the straddle problem as well as all of the other problems discussed above is the adoption of full accrual, or mark-to-market accounting. Congress has been willing to adopt such a solution, but only for certain transactions involving limited classes of assets. In particular, section 1256 provides that certain contracts not used as part of an identified hedging transaction are marked to market at the close of each taxable year. Accordingly, the holder of such a contract is taxed on any gain or loss without regard to any realization requirement. Section 1256 contracts include regulated futures contracts, certain foreign currency contracts, nonequity options, and dealer equity options. As discussed above, marking the contracts to market solves the problem of deferral in all of its manifestations by taxing gains and losses as they occur, rather than waiting for a realization event. Consequently, the treat-

172. This might arise, for example, when most of an individual’s net worth is in the form of ownership of a closely held corporation or similar real estate within a particular geographical area.

173. The one problem that marking to market fails to deal with is inflation. In fact, by removing the benefit of deferral, it has the tendency to exacerbate the effect of inflation. On the other hand, an indexation scheme is probably easier to administer in a full accrual system than in a realization system, because there is no need to track the effect of inflation over long periods of time. Note also that the adoption of mark-to-market accounting could be used to pay for the adoption of indexation. See supra note 20; Reed Shuldiner, Indexing the Federal Income Tax 18 (1990) (unpublished manuscript, on file with Texas Law Review).


176. It is interesting to note that although mark-to-market rules have been adopted for certain financial instruments, Congress has not necessarily taken the additional step of removing the capital loss limitation. This can perhaps be explained, at least in part, by revenue considerations. Compare I.R.C. § 1256(a)(3) (1988) (treating mark-to-market gain or loss as 60% long-term capital gain or loss and 40% short-term capital gain or loss) with proposed I.R.C. § 475(d)(3), H.R. 11, supra note 9 (treating mark-to-market gain or loss as ordinary income or loss), and proposed I.R.C. § 1291(e), H.R. 11,
ment of section 1256 contracts comes closest to meeting the ideal of the Haig-Simons definition of income.

D. A Summary of Current Law Modifications to the Realization Requirement

A pure realization system presents unacceptable opportunities for deferral and use of the timing option. The tax law has responded using a variety of approaches. The most comprehensive approach is, of course, the total abandonment of the realization system and the adoption of mark-to-market accounting. Less radical approaches can be divided into two classes. The first class operates by attempting to accelerate the accrual of income. Sometimes the acceleration of income is done directly, such as through mandatory accrual. At other times the acceleration of income is indirect, such as through the disallowance of an interest deduction. A second class of half-way measures operate by deferring loss, thus limiting the value of the timing option. Absent significant broadening of mark-to-market taxation, the tax laws will inevitably remain a potpourri of seemingly ad hoc regulations designed to limit the consequences of the realization doctrine.

V. Proposed Uniform Rules to Tax Financial Instruments

As shown in Part IV, a pure realization tax system suffers to an unacceptable extent from deferral and its related problems. Existing attempts to deal with the problems of deferral are inconsistent and uncertain. They rely to a great extent on categorizing instruments

supra note 9 (treating mark-to-market gain as ordinary income, but treating mark-to-market loss as ordinary loss only to the extent of previously included gains).

177. Another approach, not discussed in this Article, involves permitting the deferral of gain, but imposing an interest charge on the deferral. Current provisions that take this approach include I.R.C. § 453A (1988) (charging interest on deferred tax liability from certain nondealer installment sales) and id. § 1291 (charging interest on deferral relating to passive foreign investment companies). For a criticism of § 453A, see Evans, supra note 122, at 842-43 & n.165 (criticizing § 453A because it allows taxpayers to elect whether to treat the government as a lender, which the taxpayer will only do if the government interest rates are lower than prevailing market rates). The use of an interest charge to compensate for the effect of deferral has been recommended by a number of commentators. See, e.g., Alan J. Auerbach, Retrospective Capital Gains Taxation, 81 AM. ECON. REV. 167, 169 (1991) (proposing eliminating the incentive to defer capital gains by effectively charging interest on past gains when realized); Fellows, supra note 140, at 737-38 (proposing that tax liability be retroactively calculated for each period between the purchase of an asset and its realization event, and then adjusted for the time delay of the payment); Cynthia Blum, New Role for the Treasury: Charging Interest on Tax Deferral Loans, 25 HARV. J. ON LEGIS. 1, 6 (1988) (evaluating “using an interest charge to compensate for delay in income reporting”).

178. The categorization takes many different forms. For example, the timing rules often depend on whether an instrument is a debt instrument, an option, an annuity, a forward contract, or a notional
rather than looking at the underlying economics of the transaction to determine the timing of the income from the transaction. 179

The solution is, of course, full accrual of gains and losses. Such an approach would solve both the direct and indirect problems of deferral. Most, if not all, of the provisions of the tax law described in Part IV would become unnecessary. Nevertheless, as discussed above, I assume that such an approach will not be adopted. 180 The task, therefore, is to develop approaches that minimize the problems caused by realization-based accounting without adding significant additional problems.

A. Expected Value Transaction

The first step is to minimize the availability of anticipated deferral. The solution is, of course, to accrue expected income. Merely accruing expected income, however, does not deal with the timing option. 181 In order to limit the timing option, it is necessary to make certain that the income accrued at any point in time is as close as possible to the actual income from the instrument, not merely the expected income. This

principal product. Different timing rules are provided for capital and ordinary income. The deductibility of payments depends on whether the payment is characterized as interest or as other ordinary income.

179. Obviously, the tax law has already made significant steps in this direction. For example, the original issue discount rules for noncontingent instruments determine the timing of income based on the timing of payments, without regard to their characterization as interest or principal. Prop. Treas. Reg. § 1.1272-1, 51 Fed. Reg. 12022, 12049 (1986). Section 467 attempts to apply similar rules to leases. See I.R.C. § 467 (1988) (providing that deferred rent shall be currently accrued based on present value concepts and imputing interest on such deferred rents).

180. More precisely, I assume that the tax law will proceed slowly to embrace more mark-to-market taxation, but that in the meantime, there will be continued need for the development of rules to deal with financial instruments not taxed on such a basis. See supra note 9 (discussing recent attempts to expand mark-to-market taxation).

181. The timing option applies only where there is unanticipated deferral. See supra notes 44-45 and accompanying text. Paradoxically, accruing expected income can actually make the timing option more, not less, valuable. Consider the zero-coupon bond in Example 1 where Diva pays David $100 today in exchange for $121 in two years. The expected value of the bond in one year is approximately $110, and, therefore, under an expected value approach, Diva would have to accrue $10 in income over the first year. (This assumes a constant yield.) Diva would then have a basis in the bond of $110. Assume, however, that interest rates have increased to 15%. The value of the bond after one year would then be only $105.22. Diva would, therefore, have an incentive to dispose of the bond and recognize her loss of $4.78. On the other hand, if interest rates had fallen to 5%, the bond would be worth $115.24, a gain of $5.24 that Diva would be able to defer.

Consider, by contrast, the treatment of Diva if her expected income was not taxed. In that case, her basis in the bond at the end of the first year would still be $100, her cost. The expected value of her bond as of the end of the first year would be $110. Therefore, assuming that rates did not change, she would have a deferred gain of $10. If, however, interest rates rose to 15%, her bond would be worth $105.22 and she would still have a gain, albeit a smaller gain, that she would be able to defer. It would not be until interest rates rose over 21% that she would have an actual loss. Thus, within a broad range of interest rates (0 to 21%), the failure to accrue expected income deprives Diva of her timing option.
requires having realization events occur as frequently as possible. In order to have realization events occur as frequently as possible, without requiring revaluation of the instruments, and to accrue expected income as closely as possible, I suggest the following rules:

1. instruments should initially be split into separate components each with a single contingency;
2. income should be accrued with respect to each separate component according to that component’s expected future value determined as of the time the transaction is entered into; and
3. gain or loss should be recognized whenever a contingency is resolved.

I refer to this approach as “expected value taxation.” In Part VI, expected value taxation is further developed using a series of examples concerning wagers. Before doing so, however, it is worthwhile to make several points.

First, the discussion in this Article is intended to deal only with the timing issues inherent in complex financial instruments. It is not intended to deal with questions of character or source. By using the term “character” in this context I mean not only the question of ordinary income versus capital gains, but also any other consequence that flows from the peculiar nature of income. For example, whether income or expense is characterized as interest or as some other form of ordinary income or expense can be extremely important.

Second, this Article is not intended to provide a set of rules that can be immediately and simply applied to all financial products. Rather, it is intended to provide a uniform benchmark against which other rules can be tested. The expected value approach is to be contrasted with the frequently employed approach that I will call the “multiple paradigm” approach. Under the multiple paradigm approach, there are a variety of different approaches used in a variety of contexts. Every time a new financial

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182. In the extreme this policy would, of course, require full accrual accounting, a step that has already been ruled out. See supra notes 6-9 and accompanying text (assuming full accrual will not be used because of administrative complexities).

183. See infra subpart V(A) for a further discussion of the issue of bifurcation of financial instruments.

184. In some ways it is impossible to separate questions of character from questions of timing. For example, the most fundamental character distinction in the Code is the distinction between ordinary income and capital gain. At the same time, one of the most fundamental timing rules in the Code is the capital loss limitation, which is obviously tied to the character of the income. Nevertheless, I think it is important to separate, at least at the theoretical level, questions of timing and character. Once appropriate timing rules are determined, they can be integrated with the character rules.

185. For example, an interest expense may not be deductible, see I.R.C. § 163(d) (1988), while a noninterest expense may be deductible under some other section. See supra note 81 for a partial list of interest restrictions.

186. Edward Kleinbard uses the term “cubbyhole” to refer to the existing tax paradigms. Edward
instrument is introduced, there is an attempt to analogize the new instrument to the existing paradigms. It is then argued that the instrument should be taxed in the same manner as the other instruments within the chosen paradigm. The principal justification for this approach is one of consistency—similar transactions should be taxed in a similar fashion.\(^{187}\)

The flaw in the multiple paradigm approach is that a new instrument can generally be analogized to more than one existing instrument. Thus, the approach is not well defined. Moreover, the creators of new instruments are able to design instruments to be arbitrarily close to the line between any two (or more) paradigms.\(^{188}\) Thus, to the extent that the paradigms offer different timing rules, the timing of income becomes elective and the goal of consistency is not met. Similarly, a particular financial instrument can generally be created using a variety of different instruments as building blocks.\(^{189}\) There is, however, no guarantee that the taxation of the combination of the various building blocks will be the same as the combined taxation of the individual building blocks.\(^{190}\) On the other hand, if there is a uniform benchmark against which each new product can be measured, it is possible to create a situation in which there is a much greater level of consistency, predictability, and accuracy in the timing of income.\(^{191}\)

Third, it is sometimes argued that the timing of income with respect to a transaction is relatively unimportant as long as both sides to the transaction are taxed in the same manner.\(^{192}\) The principal fallacy in this argument is that one can never assume that both sides of the transaction will face the same tax rate. To the contrary, one may usually assume that taxpayers will arrange themselves so that the side of the transaction that accelerates income is held by a person in a low or zero bracket, and the

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\(^{189}\) For example, Kau lists 13 different ways to borrow money using a combination of debt and different financial products. See Kau, supra note 187, at 1004-05.

\(^{190}\) For example, prior to the recent revision in the OID regulations, a contingent debt instrument made up of a noncontingent debt obligation and a cash-settlement option was taxed differently than a separate noncontingent debt obligation and cash-settlement option. See supra section IV(A)(2).

\(^{191}\) See Jeff Strnad, Taxing New Financial Products (July 1992) (unpublished manuscript, on file with the Texas Law Review) (discussing the application of “spanning” theory to the taxation of financial products).

\(^{192}\) See, e.g., Halperin, supra note 68, at 510-11 (suggesting that overtaxation of one side of a transaction can compensate for undertaxation of the other side of the transaction); GRAETZ, supra note 49, at 944 (arguing “that the Internal Revenue Code may, to some extent at least, be indifferent to the timing of income or deductions so long as no tax advantage results”).
side that defers income is held by a person in a high bracket. In addition, the symmetric treatment may often be more apparent than real. For example, if one side of the transaction is able to force a realization event for itself without forcing a realization event for the other side, any acceleration of income can be neutralized through a realized loss, while the corresponding acceleration of loss remains unaffected.

In light of these concerns, I believe that it is a mistake to rely solely on symmetry to provide appropriate tax rules. On the other hand, the rules that I advocate are symmetric. Their symmetry, however, follows naturally from the symmetry inherent in the economics of the underlying transaction, rather than being driven by an arbitrary choice of rules.

B. The Bifurcation and Integration of Financial Instruments

When faced with a financial instrument, there are at least three general approaches to determining its taxation. First, it can be viewed as a single unified instrument. Second, it can be “bifurcated” into its component parts. Third, it can be integrated with one or more other financial instruments to form a new instrument. For example, an interest rate swap could simply be taxed as a swap. Alternatively, it could be broken down into a series of forward contracts. Finally, it could be integrated into a debt instrument to form a new debt instrument with different terms.

The tax law takes no consistent approach to the question of unified, bifurcated, or integrated treatment. For example, consider the original issue discount rules. The basic approach of the OID rules is one of treating the debt instrument as a single unified instrument, as seen, for example, in the use of a single yield for purposes of computing the accrual of discount. In certain circumstances, however, the OID rules take a
bifurcation approach. For example, the issue price of an investment unit must be allocated among the elements of the unit on the basis of relative fair market value.\textsuperscript{199} Another area where the OID rules take a bifurcation approach is the treatment of contingent interest.\textsuperscript{200} Finally, in other circumstances, the OID rules take an integration approach, requiring independent debt instruments to be aggregated for purposes of determining the accrual of discount.\textsuperscript{201}

The same tension between these approaches is apparent outside of the OID rules. For example, the proposed regulations on notional principal contracts take the overall approach of treating a notional principal contract as a single instrument.\textsuperscript{202} When a financial instrument is composed of two or more notional principal contracts, however, the proposed regulations require bifurcation of the instrument into separate contracts.\textsuperscript{203} On the other hand, in the case of hedged notional principal contracts, the regulations take an approach closer to integration.\textsuperscript{204}

In the area of international taxation, there has been a general movement toward integrated treatment of hedged transactions. For example, section 988(d), added by the 1986 Act, provides authority for the Treasury to write regulations providing for integrated treatment of currency hedging transactions.\textsuperscript{205} Under this authority, regulations now permit a foreign currency borrowing that has been hedged to preserve a U.S. dollar

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\textsuperscript{199} I.R.C. § 1273(c)(2) (1988).

\textsuperscript{200} Where the sum of the noncontingent payments is greater than or equal to the issue price of the overall instrument, the instrument is bifurcated into separate contingent and noncontingent debt instruments. Prop. Treas. Reg. § 1.1275-2(e), (g), 56 Fed. Reg. 8308, 8310-11 (1991). See supra section IV(A)(2).


\textsuperscript{202} See Prop. Treas. Reg. § 1.446-3(e)(4)(i), 56 Fed. Reg. 31350, 31359 (1991) (specifying the treatment of compound and disguised notional principal contracts). Given the fact that almost any notional principal contract can be described as the combination of two other notional principal contracts, the scope of this bifurcation rule is unclear. See infra section VII(D)(2) (describing how any multiperiod notional principal contract is really just a series of single-period contracts); see also Prop. Treas. Reg. § 1.446-3(e)(4)(ii) & (iv), 56 Fed. Reg. 31350, 31359 (1991) (requiring bifurcation of certain notional principal contracts into a notional principal contract and a loan).

\textsuperscript{203} See Prop. Treas. Reg. § 1.446-3(e)(4)(i), 56 Fed. Reg. 31350, 31359 (1991) (permitting the Commissioner to require that hedged contracts be treated in a manner consistent with the economic substance of the transaction as a whole). Although the regulations do not provide for integrated treatment as such, the effect of taxing the hedge in a manner consistent with the transaction as a whole should provide timing results that are consistent with integration. See Prop. Treas. Reg. § 1.446-3(e)(4)(v) example 4, 56 Fed. Reg. 31350, 31360 (1991) (requiring integration of two swap contracts into a single loan).

\textsuperscript{204} See I.R.C. § 988(d) (1988).
equivalent to be treated as a single integrated dollar-denominated borrowing. 206 Similarly, the 1986 Act added section 864(e), which, inter alia, provided regulatory authority for integrated treatment of financial transactions for purposes of interest allocation. 207 A final example of the increased use of integrated treatment is section 1092, which has the effect of treating both legs of a straddle as a single transaction for purposes of loss recognition. 208

At first glance, expected value taxation appears to rely on bifurcation of the financial instruments. In fact, that is not the case. The purpose of bifurcation is simply to assist in the estimation of expected future values of each component and to help delimit the points where income should be realized based on the outcome of contingencies. An alternative approach that is analytically equivalent would be to simply determine the expected future value of the entire instrument at each point in the future and to accrue income based on the overall expected value. More importantly, one of the goals of the expected value approach is to reduce the importance of the debate over bifurcation by making the taxation of a given instrument independent of whether or not it is bifurcated or integrated into another financial instrument. If each component of a financial instrument is taxed according to its expected future value, in theory, it should make no difference whether an instrument is bifurcated or integrated with another instrument. The aggregate income recognized under the transaction should be the same. 209

The proposal for expected value taxation does not, however, solve the problem of the timing option or the related problem of tax straddles. Accordingly, it will make a difference whether related transactions are integrated for purposes of loss recognition. To the extent that the timing option remains, integrating related transactions has the benefit of reducing the opportunity for loss recognition on one part of a transaction while gain is unrecognized on another part of the transaction. 210

208. I.R.C. § 1092 (1988); see supra subpart IV(B) (discussing the restrictions on tax straddles).
209. A full accrual system, such as I.R.C. § 1256 (1988), would make the question of bifurcation or integration entirely irrelevant except to the extent that the aggregate value of two separate instruments differed from the value of the combined instrument. Assuming perfect capital markets, there should be no such difference in values. See BREALEY & MYERS, supra note 18, at 128-29. In practice, there would likely be differences. See id. at 412.
VI. An Illustration of Expected Value Taxation Through Wagers

Even the most complex financial instrument can be thought of as a combination of certain and uncertain cash flows. In turn, uncertain cash flows can be thought of as the payoffs from simple wagers. Given this equivalence, it is possible to study an approach to the taxation of financial instruments by analogy to the taxation of wagers. In this Part, I pose a series of hypothetical wagers and use these wagers to develop and test expected value taxation.

A. Single Bets

Examples 4 through 6 deal with a single wager. In Example 4, the wager is a fair wager with no prepayment being made by either party. Examples 5 and 5A introduce a form of prepayment whereby one party’s payment under the bet is placed in escrow. In Example 5 interest on the escrow account is paid to the depositor, while in Example 5A interest is paid to the other party. Finally, Example 6 analyzes a bet where one party’s obligation is prepaid.

1. Example 4: No Prepayment.—Consider a bet on whether a Democrat or a Republican will win the 1992 presidential election. Assume that because of my fondness for the underdog, I bet that a Democrat will win. You, being strictly rational, bet that a Republican will win. Not being a fool, I insist on odds and we settle on a $1000 bet with 4-to-1 odds (i.e., if a Democrat wins you will pay me $4000, and if a Republican wins I will pay you $1000). We shake hands and await the outcome.

211. To put Examples 4 through 10 in historical perspective, the author would like to note that the examples were originally written in 1989: before Mr. Perot had entered the race as an independent, before President Bush had broken his no new taxes pledge, and before the odds on the 1992 election had radically changed.

212. Odds and probabilities are alternative ways of expressing the same concept. In particular, the statement that the odds are 4-to-1 in favor of a certain outcome is equivalent to the statement that the probability of the outcome is .8 or 80%. More generally, if the odds of a particular outcome are x to y, the probability of the outcome is:

\[
\frac{x}{(x+y)}
\]
Initially, there should be no tax consequences arising out of our bet. Our bet was an arm’s length transaction. Therefore, it is reasonable to assume that our mutual obligations have the same value and that neither of us has income. Thus, even under a pure accrual system, there would be no accrual of income.

Of course, it is possible that one or both of us are better off and in a strict economic sense have income. For example, I may have been willing to settle for 3-to-1 odds and you may have been willing to go as high as 5-to-1. In that case, we would both perceive that we had made a good bargain, and, in that sense, we would both be better off. In theory, it could be argued that it would be appropriate to increase our tax liabilities based on our perceived increase in well-being. Even if it were desirable, however, it would obviously be impractical to tax us on our perceived increase in welfare. The only conceivable administrable approach would be to tax us based on objective market valuations.

Even market valuations, however, should not be enough to impose a tax at this point. For example, assume that the market “price” for such bets is 3-to-1. In that case, I would have a favorable bet as judged against the market. If the bet were immediately marked to market, the bet would have a positive market value, and I would have taxable income. While in theory it would be appropriate to tax this income at this time, it would, in general, be unwise from an administrative point of view. The cost of discovering and valuing such off-market transactions would usually

213. For example, it can be argued that the appropriate tax base is ability to pay and that income is merely a proxy for ability to pay. See, e.g., Graetz, supra note 48, at 17 (stating that tax equity presumes those “persons with equal ability to pay taxes should pay equal amounts of tax”). The further argument can then be made that ability to pay should be based on the subjective valuation of one’s well-being, rather than on objective market valuations. But cf. Haig, supra note 5, at 5 (questioning whether “satisfactions are really the proper theoretical basis for apportioning tax”). Determining the tax base on the basis of subjective valuations is equivalent to an argument that consumer surplus should be taxed. See Shavro, supra note 326, at 1191 (noting that consumer surplus theoretically constitutes income, but is immeasurable).

214. Cf. Haig, supra note 5, at 5 (arguing that “everyone will agree that [subjective valuations] constitute an entirely impractical basis”).

215. The value of the bet can be determined by the following argument: I could immediately enter into an offsetting bet at the 3-to-1 market odds. In particular, I could enter into a bet whereby I would be paid $1250 if a Republican won, and I would pay $250 at the conclusion of the bet. (If a Democrat won, I would be paid $4000 on the first bet and would pay $1250 on the second bet.) Because the payment would be deferred for approximately a year, the value of the pair of bets would be the present value of $227. The second bet, however, is a market bet and therefore has a zero value. Accordingly, the first bet must be worth approximately $227.
overwhelm the benefit. It seems much better to adopt the assumption that arm's length transactions give rise to no immediate income.

The following day, George Bush admits that he has again misread his own lips and proposes increasing taxes again by getting rid of the fifteen percent tax bracket. The odds on the 1992 election shift to 3-to-1. Our bet is now worth $227 to me, and you have a corresponding unrealized loss of $227. Under a full accrual system, the bet would be marked to market, and we would each recognize our gain and loss. As discussed above, however, I have assumed that marking to market is unacceptable.

The failure to mark to market means that, absent a realization event, I am being undertaxed on my economic income from the bet while you are being overtaxed on your economic loss. The mistaxation of our bet is caused by unanticipated deferral. There is no anticipated deferral because the expected value of the bet, at the time we entered into it, was presumed to be zero.

The potentially greater problem is the timing option—the ability of the losing party to recognize its loss while the winning party defers its gain. It is the ability to manipulate realization that lowers the expected effective tax rate on the entire transaction. The value of the timing option can be minimized by having realization events occur as frequently as possible. In Example 4, however, there is no logical time to value the bet prior to its conclusion. In other words, there is no practical way to subdivide the bet into components so that the income on each piece of the instrument can be individually assessed at an earlier date.

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216. The benefit of taxing such transactions would be small. To begin with, little, if any, revenue would be collected because of the fact that any gain on one side of the transaction would be counteracted by loss on the other side of the transaction. Furthermore, there would be little opportunity for taxpayers facing different marginal rates to align themselves on the "correct" side of the transaction. See supra text accompanying note 193 (describing how taxpayers with different marginal rates may increase the tax benefits arising from a transaction). It is therefore difficult to argue that any serious efficiency implications arise from failing to properly tax such gains and losses. Thus, the only argument for taxing such gains and losses would seem to be one of equity. The equity concerns, however, would generally be insufficient to warrant the administrative cost.

217. See supra note 215 for the computation of this amount.

218. See supra note 180 and accompanying text.

219. See supra text accompanying notes 50-51.

220. Example 4 is really a modification of Example 2A. See supra text accompanying note 28. In Example 2A, all of the contingencies were resolved once the coin was tossed. In Example 4, the contingency is not resolved until the conclusion of the bet (i.e., the 1992 election), but the probabilities continually change.

221. Increasing the frequency of realization events is not the only solution. Another approach is to defer loss beyond the time of a realization event. Loss deferral is the approach adopted by, for example, I.R.C. §§ 1211-1212 (1988) (the capital loss limitation rules); id. § 1091 (the wash sale rule); and id. § 461(h) (the economic performance rule).
Note also that to the extent that a market exists for the bet, the problem is much greater. If you, as the current loser, have no choice but to hold on to the bet, then there is de facto no timing option. Even in the absence of a market, however, it would ordinarily be possible to terminate the contract by mutual consent (i.e., you should be able to pay your counterparty to terminate the contract, thus forcing a recognition event). Of course, termination of the contract would force recognition by both parties, thus potentially eliminating any net value to the timing option.

Assume now that Bush wins a second term, and I pay you $1000 as required by the wager. As all contingencies have been resolved and payment has been made, there is no reason to further delay recognition of

\[\text{222. The ability of a party to a contract to terminate the contract at a "market" price in the absence of a formal market will vary greatly depending upon the circumstances. Factors that will tend to make termination easier include: (1) the ease of valuing the contract; (2) the extent of ongoing relationships with the counterparty; and (3) the availability of other potential counterparties.}

\[\text{223. Even if both parties face the same marginal rate, there may be value to the timing option if one party is indifferent to the occurrence of a realization event. For example, the proposed regulations permit dealers in notional principal contracts to elect to account for such contracts under a mark-to-market system. Prop. Treas. Reg. § 1.446-4, 56 Fed. Reg. 31350, 31361 (1991). Consider a swap contract between Townbank, a swap dealer, and LBM, an industrial corporation. Under the terms of the contract, LBM has agreed to pay Townbank a fixed interest rate times a notional principal amount, and Townbank has agreed to pay LBM a variable rate times the same amount. Assume that Townbank has made the election to mark the notional principal contracts to market under § 1.446-4(a). See id. If fixed rates rise, LBM will have a gain on the contract, and Townbank will have a loss. Townbank will, however, be able to recognize its loss without forcing a realization event, thereby permitting LBM to defer its gain. If fixed rates fall, LBM will have a loss and Townbank will have a gain. LBM can then recognize its loss by terminating the contract and making a termination payment to Townbank. Id. § 1.446-3(e)(6)(ii), 56 Fed. Reg. 31350, 31360 (1991). While ordinarily the making of such a payment would cause Townbank to recognize gain, Townbank will recognize no further gain because it will have already recognized gain under its method of accounting. In summary, LBM will get the advantage of the timing option while Townbank will be taxed neutrally.}

\[\text{The mark-to-market election under § 1.446-4 is particularly interesting in light of § 1.446-3(e)(6) of the proposed regulation. Paragraph (e)(6) provides, inter alia, that when a contract is assigned, the assignee is a recognition event for both the assigning party and its counterparty (the "symmetric recognition rule"). See id. The effect of the symmetric recognition rule is to limit the timing option where both parties to a swap contract are taxable and neither party makes the mark-to-market election. Each party retains the timing option, but its effect on the fisc is neutralized, because when one party exercises the timing option, the other party must immediately recognize his income or loss from the transaction. When one party, however, is a dealer electing mark-to-market treatment, the symmetric recognition rule has no effect when the nondealer counterparty assigns the contract and triggers early recognition of the loss. Thus, the effect of the mark-to-market election is to neutralize the symmetric recognition rule. Similarly, when the dealer has a loss, it will be able to recognize its loss without triggering gain for the nondealer.}

\[\text{More perversely, the combination of the mark-to-market election and the symmetric recognition rule potentially permits a nondealer party to recognize its loss without the nondealer having to assign the contract. In particular, if the nondealer can convince the electing dealer to assign the contract, the nondealer will recognize its loss under the symmetric recognition rule without any adverse tax consequences to the dealer.}
my loss and your gain. Moreover, the amount of the loss and gain are correctly measured by the cash payment made at the termination of the bet.

2. Example 5: Escrow Account (Depositor Receives Interest).—Consider now the same bet as in Example 4 except that you decide that anyone who would bet that a Democrat will win a presidential election must be unreliable and, therefore, a credit risk. You insist that I post collateral. I do so by depositing $1000 in an escrow account from which I receive the interest.

Ideally, the tax consequences of the bet in Example 5 should be exactly the same as the consequences of the bet in Example 4. Whether or not you have security should not affect your income when the bet is first entered into, nor does it militate in any significant way for interim marking to market of the contract.

3. Example 5A: Escrow Account (Depositor Does Not Receive Interest).—Assume the same bet as in Example 5, except that we agree that you receive the interest from the escrow account. Now, we have significantly changed the terms of the bet. In essence, I am loaning you $1000 on an interest-free basis. Assuming we end up with the same economic bet, I will insist that I only deposit the present value of $1000, or $909. You should be indifferent because you will have $1000 at the time of the election. I will be indifferent because I will have an asset that is expected to be worth $1000 at the same time. Of course, if I win the bet, you will pay me $5000. If I lose, I will get nothing back, but I will have satisfied my obligation to pay $1000. In either case, the asset is worth $1000.

Under these circumstances, the tax consequences of the arrangement in Example 5A should be different from that of the previous bets. I have

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224. In Example 4, payment is made at the time the contingency is resolved. This result is not meant to suggest that payment is either a necessary or a sufficient condition for gain recognition. Compare Prop. Treas. Reg. § 1.1275-4(e)(3)(ii), 51 Fed. Reg. 12022, 12091 (1986) (providing for gain recognition without payment when contingent interest on a debt obligation becomes fixed and is payable in more than six months) with id. § 1.1272-1(a)(2)(ii), 51 Fed. Reg. 12022, 12051 (1986) (providing for payment without recognition of income when amounts other than qualified periodic interest are paid with respect to an installment obligation).

225. For purposes of exposition, I assume away credit risk in the previous wager and assume that the escrow covers any credit risk in this wager. I ignore credit risk in the subsequent wagers.

226. I am assuming that we can borrow and lend at a rate of 10% and that the election is in one year.

227. $4000 for winning the bet plus $1000 refund of my deposit.
acquired an asset for $909 that is expected to increase in value in one year to $1000. It is appropriate to tax the expected income from the deposit in the same manner as a zero-coupon bond. As with the zero-coupon bond, I, as the “holder,” should be required to accrue $91 of income over the intervening year. Correspondingly, you, as the “issuer,” should be entitled to an equal deduction over the same period. At the time of the election, if I win, I would have additional income of $4000.\textsuperscript{228} If I lose, I would have a loss of $1000. The consequence of failing to accrue the $91 in expected income is that there would be anticipated deferral on the bet.\textsuperscript{229}

While the expected income of $91 should be taxed on an accrual basis, the actual income or loss should continue to be deferred until the termination of the bet or some earlier realization event. Note that the taxation of the bet in Example 5A is the same as the taxation of an economically equivalent arrangement whereby instead of placing the $909 in an escrow account, I purchase from you a zero coupon bond with a ten-percent yield for $909 with the bond pledged as collateral for the bet.

4. Example 6: Prepayment.—You offer to enter into a bet whereby if a Democrat is elected you will pay me $5000, and if a Republican is elected I will pay you nothing. Since it is not a fair bet, you insist I pay you $909 to enter into the bet. I do so.\textsuperscript{230}

The first question is whether the $909 should be income to you and a loss for me at the time the bet is entered into. The correct answer must be that you should have no taxable income merely by entering into the transaction and receiving payment.\textsuperscript{231}

\textsuperscript{228} My basis in the bet should be my initial payment of $909 plus the accrued $91 in interest. My gain would therefore be the $5000 cash receipt minus $1000 basis, or $4000.

\textsuperscript{229} See supra text accompanying notes 49-49 and 65-70 for a discussion of the undesirable effects of anticipated deferral.

\textsuperscript{230} I will sometimes refer to a bet that requires an initial payment as an off-market bet.

\textsuperscript{231} Note that it can be argued that this result is inconsistent with Schlude v. Commissioner, 372 U.S. 128 (1963). Schlude concerned the taxation of dance instructors using the accrual method and held that the Commissioner had not abused his discretion under the § 446(b) clear reflection of income requirement by requiring the taxpayer to recognize income upon the receipt of prepayments for future dance lessons. Schlude, 372 U.S. at 133-37. Schlude can be read for the proposition that an accrual method taxpayer has income at the earlier of the time that the item of income accrues or the receipt of payment. A better reading of the case, however, is that the courts will give the Commissioner significant latitude in determining when a method of accounting clearly reflects income. This latter reading of the case is consistent with the approach taken in proposed regulations on notional principal contracts. See Prop. Treas. Reg. § 1.446-3(e)(3), 56 Fed. Reg. 31350, 31357 (1991), and its predecessor, I.R.S. Notice 89-21, 1989-1 C.B. 651 (stating that up-front payments in notional principal contracts must be amortized over the life of such contracts); see also Rev. Proc. 71-21, 1971-2 C.B. 549 (stating that under specified circumstances, an accrual basis taxpayer may defer the inclusion of payments received in one taxable year for services to be performed in the succeeding taxable year where such treatment is consistent with the taxpayer's book accounting); Treas. Reg. § 1.451-5 (as
There are several reasons for the conclusion that there should be no immediate tax consequences of the initial payment. First, in economic terms you have no income. You are no better off after entering into the transaction than you were before entering into it. This is because the $909 increase in your assets has been offset by your liability, which has an expected value of $909.232 Second, to accept any other answer would permit taxpayers to manipulate their income in a manner that would invite wholesale tax avoidance. For example, it might permit complete avoidance of the limitations on the carryforward period for net operating losses,233 as well as the limitations on loss carryforwards in corporate acquisitions.234 Finally, assuming that the payor is not permitted an equal and offsetting loss, the effect of treating the payment as income is to overtax the transaction. Overtaxing the transaction is generally inefficient, leading to an alteration in the form of the transaction (with presumably greater transaction costs) and to a reduction in the number of such transactions.235 Just as there should be no income from the receipt of the $909 payment, there should be no deduction. The reasoning parallels that just given on the income side.236

The next question is whether there should be any income or deduction over the life of the bet (i.e., up until the moment before the election). There are several aspects to this question. First is the issue of whether the bettors should have income or loss during the life of the bet resulting from changes in the expected outcome of the wager. In this


232. The existence of an offsetting liability is the usual justification given for not including borrowed funds in income. See, e.g., Commissioner v. Tufts, 461 U.S. 300, 307 (1983) ("When a taxpayer receives a loan, he incurs an obligation to repay that loan at some future date. Because of this obligation, the loan proceeds do not qualify as income to the taxpayer."); GRAETZ, supra note 48, at 216 ("In Henry Simons' terms, there is no change in the net worth of either party [to a loan]. The increase in funds to the borrower is offset by an equivalent liability to repay . . . .").

233. For example, consider a taxpayer with an expiring net operating loss of $909. The taxpayer could enter into two bets. In the first bet, she would receive $909 immediately and would be required to pay $5000 in one year if a Democrat is elected. In the second bet, she would receive $4000 in one year if a Democrat is elected and would pay $1000 in one year if a Republican is elected. Therefore, taken together, the bets would produce receipts of $909 immediately and outlays of $1000 in one year. If the receipts were immediately taxable, she would have $909 of income in the current taxable year and $1000 loss in the next taxable year, effectively refreshing her net operating loss for another 15 years. See I.R.C. § 172(b)(1)(A)(ii) (Supp. II 1990) (providing that net operating loss can be carried forward to each of the 15 taxable years following the taxable year of the loss).

234. See id. § 382. Attempts to use up-front payments to avoid § 382 may also be prevented by treating subsequent payments under the transaction as built-in losses. Id. § 382(b)(6). It is, however, better to directly attack the mismeasurement of income, rather than to try to foresee every possible use by taxpayers of such mismeasurement.

235. See supra subpart III(D) for a discussion concerning efficiency consequences.

236. On the deduction side, it is much easier to see the opportunities for tax avoidance, since the circumstances in which taxpayers prefer tax losses without economic losses overwhelm the circumstances in which taxpayers prefer taxable income without economic income.
respect, however, Example 6 is no different than Examples 4 or 5 and should be treated the same. In other words, it should be assumed that the probability of the outcomes is unchanged and there is no gain or loss.237

A separate issue is whether the payor of the $909 should be permitted to amortize the payment and, correspondingly, whether the payee should be required to take the payment into income over the same period. In general, the payor should be permitted to amortize her payment if and only if the value of the asset is expected to decline over the period.238 Here, the payor has no such expectation and, accordingly, no amortization should be permitted.

The final issue is whether the payor should be required to take any imputed income into account over the life of the bet. In this regard, the prepayment in this example is equivalent to the deposit in Example 5A. The payor has purchased an asset which is expected to increase in value to $1000 over the next year. In order to avoid creating a transaction with anticipated deferral, it is necessary to tax the payor currently. Accordingly, the payor should have imputed income of $91 from the bet. As of the election, she would have a $1000 basis and either a $1000 loss (if the Republicans won) or a $4000 gain (if the Democrats won). Note that under the approach described above for Examples 5A and 6, the incidence of taxation on each party is the same whether the payment is denominated a security deposit or an up-front payment for entering into an off-market bet.

B. Multiple Bets

Examples 4 through 6 dealt with the taxation of a single bet. The following four examples demonstrate how the problem becomes more difficult when multiple bets are introduced. Example 7 introduces a simple series of two bets in which each bet is on-market. Example 8 expands Example 7 by introducing prepayments while assuming that the odds on the underlying bets are unchanged. Example 9 demonstrates that with prepayments the underlying economics of a series of bets, and thus the desired taxation of the bets, is not determined solely by the terms of the bet. This point is demonstrated by showing that the pattern of cash flows in Example 8 is consistent with different underlying odds. Finally, Example 10 demonstrates that the inability to determine the underlying bet in the case of prepayment extends to the case in which there appears to be

237. See supra text accompanying notes 215-16 (adopting the assumption that arm's length transactions give rise to no immediate income).

238. The statement in the text is essentially present law for depreciable assets. See I.R.C. § 167 (1988) (allowing as a depreciation deduction a reasonable allowance for the exhaustion and wear and tear of property used in a trade or business or held for the production of income).
no prepayment. The case of a hidden prepayment is demonstrated by comparing the bet in Example 7 to a new bet with identical odds and identical payment times, but different payment amounts.

1. Example 7: No Prepayment.—Consider a somewhat more complicated bet. Rather than betting only on the next election, we bet on the next two elections. Assume that the odds are 4-to-1 and 3-to-1 on the first and second elections, respectively. Thus, if a Democrat wins the first election, you will pay me $4,000, and if a Republican wins, I will pay you $1,000. If a Democrat wins the second election you will pay me $4,000, and if a Republican wins I will pay you $1,333.239

Initially, for the same reasons as in the case of the single bet, there should be no income to either party. Similarly, we begin with the assumption that the bet will not be marked to market prior to the first election. The question of the appropriate taxation becomes more difficult once the outcome of the first election is known. Assume that a Democrat wins the first election. In a pure mark-to-market system, I would have income of $4,000 from the first part of the bet plus or minus the value of the remaining part of the bet. Assuming, as before, that we are unwilling to mark the bet to market, there are a variety of alternatives.

One possibility would be to treat the payment as an open transaction and wait until the completion of the bet (the second election) to determine gain or loss. Under this alternative, no immediate tax consequences would flow from the outcome of the first bet or the resulting receipt of $4,000. The primary problem with this approach is that by extending the period before realization the timing option is made more valuable.

A second possibility would be to mark the bet to market at the time of the first election.240 There is no reason, however, to believe that it is any easier to value the second part of the bet at the time of the first election than it would be at any other time. Thus, this alternative suffers from the same sort of administrative problems of any mark-to-market approach.

A third possibility would be to value the contract at the time of the

239. Example 7 is similar to Strnad’s dual lottery example, except that the odds of the second part of the bet are affected by the outcome of the first part. See Strnad, supra note 6, at 1910.

240. Marking to market at the time of the first election differs from a pure accrual system in that the accrual is triggered by a specific event internal to the bet (or financial instrument) rather than being triggered by the passage of time, e.g., every year.
first election using the conditional probabilities as determined at the time the contract was initially entered into.\footnote{See \textit{infra} Appendix D (describing the treatment of correlated events).} For example, assume that as of the time the bet was first entered into we agreed that if the Democrats won the first election, the odds against their winning the second election would become 2-to-1 rather than 3-to-1. In that case, assuming that the probabilities have not otherwise changed, once the Democrats win the first election, my 3-to-1 bet for the second election has a known value, approximately $291.\footnote{The expected value of the payoff in four years is $427 (1/3 \times 4000 - 2/3 \times 1333). The bet is worth the present value of $427, or $291.} Thus, using the initial conditional probabilities, I would have income of $4291\footnote{$4000 from the first part of the bet plus $291 from the second part of the bet.} and you would have an equal loss.

The problem with valuing the bet based on the conditional probabilities is that it requires knowing the conditional probabilities. In general, it is likely to be more difficult to determine the conditional probabilities than it would be to simply value the second bet at the time of the election. It is thus unlikely that this would prove to be a fruitful approach.\footnote{Where the outcome of the earlier contingency determines the later contingency with certainty, it would generally be appropriate to take that fact into account in determining income at the time that the first contingency is resolved. For a more complete discussion, see \textit{infra} Appendix D. See \textit{infra} Appendix C for a discussion of \textit{Prop. Treas. Reg. \S} 1.1275-4(e)(3)(ii) & -4(f)(2)(v) (explaining the treatment of contingencies that have been fixed but are payable more than six months in the future).}

A fourth approach, and the one that I believe is most attractive, is to treat the two bets as independent for timing purposes and to tax each bet in the same manner as a single bet. Under this approach, at the time of the first election I would have income of $4000 on the first bet, but would wait until the outcome of the second election to determine the taxation of the second bet. This approach strikes a balance between the highly accurate, but administratively costly, full accrual system and the open transaction approach with the problems of deferral and the timing option that it presents.\footnote{Note, however, that the bifurcation of the transaction into two independent bets may not be as simple as it appears. In particular, the bifurcation approach assumes that the two bets were each correctly priced. As discussed below, there is generally no reason to believe that this holds true. See \textit{infra} text accompanying note 251.}

2. \textit{Example 8: Prepayment}.—As a variant of the previous pair of bets, assume that I pay for my side of the bets up front. In that case, I would make a payment of $1737\footnote{$1737 is equal to the present value of a $1000 payment in one year plus the present value of a $1333 payment in five years.} and you
will pay me $5000 if there is a Democratic victory in the first election and $5333 if there is a Democratic victory in the second election.

The taxation of the bet in Example 8 follows easily from the rules suggested above. The overall bet should be separated into the two individual bets and the prepayment should be allocated among the bets based on the fair market value of each bet. The first bet has a payoff of $5000 in one year with a probability of twenty percent. Its value is, therefore, $909. The second bet has a payoff of $5333 in five years with a probability of twenty-five percent. Its value is $828. Accordingly, I would be treated as paying $909 for the first bet and $828 for the second bet, for a total of $1737. I would then be required to accrue income on the two bets as shown in the table below.

Table 1: Imputed Income from Series of Bets with Prepayments

<table>
<thead>
<tr>
<th>Year</th>
<th>Income accrued from first bet</th>
<th>Income accrued from second bet</th>
<th>Total income accrued</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$91</td>
<td>$83</td>
<td>$174</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>91</td>
<td>91</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>121</td>
<td>121</td>
</tr>
<tr>
<td>Total Income</td>
<td>$91</td>
<td>$505</td>
<td>$596</td>
</tr>
<tr>
<td>Purchase Price</td>
<td>909</td>
<td>828</td>
<td>1737</td>
</tr>
<tr>
<td>Final Basis</td>
<td>$1000</td>
<td>$1333</td>
<td></td>
</tr>
</tbody>
</table>

During the first year, I would accrue $174 in income, of which $91 would be attributable to the first bet. As of the end of the first year,

247. Note that the income in each year from the bets with prepayments in Example 8 is the same as would be the case if there were no prepayments on the bets, but there were two zero-coupon loans, a one-year loan with an issue price of $909 and a five-year loan with an issue price of $505.
my basis in the first bet would be $1000. If a Democrat won, I would be paid $5000 and have a gain of $4000. If a Republican won, I would pay nothing and have a loss of $1000. I would then accrue an additional $422 in income with respect to the second portion of the bet over the next four years. At the time of the second election, I would have a basis in the bet of $1333. If I won, I would receive $5333 and have a gain of $4000. If I lost, I would have a loss of $1333. As before, the principal weakness of this approach to taxation is the existence of the timing option. The timing option inherent in this approach, however, should not be significantly greater than the option afforded by two independent bets.\footnote{The value of the timing option is lessened by the inability to trade the bets separately. The value is increased if selling the two bets together has lower transaction costs than selling them as two independent bets.}

Note, however, that the proposed solution imposes a significant informational burden. It is now necessary to know the odds on the first two bets at the time the bets are placed. In other words, it is necessary to know the fair market value or market price for each individual bet. To see this informational requirement more clearly, consider the following example.

3. **Example 9: Prepayment with Modified Odds.**—Consider a modified series of bets with prepayment. Under the first bet in the series, I would pay you $1135 for a Republican victory, and you would pay me $3865 for a Democratic victory (equivalent to odds of 3.4-to-1). Under the second bet, the payments would be $1135 and $4198 (equivalent to odds of 3.7-to-1). Assuming prepayment, I would pay $1032 for the first election and $705 for the second election for a total of $1737. You would then pay me $5000 ($1135 + $3865) and $5333 for a Democratic victory in the first and second elections, respectively.

The cash flows from the bets in Example 9, including the prepayment, are identical to those from the bets in Example 8. In Example 9, however, the imputed income would be different, as is shown in Table 2.
Table 2: Imputed Income from Series of Bets with Modified Odds

<table>
<thead>
<tr>
<th>Year</th>
<th>Income accrued from first bet</th>
<th>Income accrued from second bet</th>
<th>Total income accrued</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$103</td>
<td>$70</td>
<td>$173</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>94</td>
<td>94</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>103</td>
<td>103</td>
</tr>
<tr>
<td>Total Income</td>
<td>$103</td>
<td>$430</td>
<td>$533</td>
</tr>
<tr>
<td>Purchase Price</td>
<td>1032</td>
<td>705</td>
<td>1737</td>
</tr>
<tr>
<td>Final Basis</td>
<td>$1135</td>
<td>$1135</td>
<td></td>
</tr>
</tbody>
</table>

In addition, my basis in the first bet as of the first election would be $1135, instead of $1000, and my basis in the second bet as of the second election would also be $1135 instead of $1333.

Example 9 demonstrates that, given the amount of the up-front payment and the payoffs from the bets (the known cash flows), more than one allocation between the two bets is possible. In fact, an unlimited number of allocations are possible. The particular allocation in Example 9 was arbitrarily selected so that the amount paid in case of a Republican victory was the same (as of each respective election date). Obviously, there is no reason to believe that every pair of bets would meet this criterion.

249. The total first-year income in Table 2 is less than the total first-year income in Table 1 due to rounding.

250. More generally, any time there is a single prepayment for two future costs, there is essentially an infinite set of future values that the prepayment is consistent with. To see this, consider two payments defining a bet, $p_1$ and $p_2$, where $p_1$ is to be paid in one year and $p_2$ is to be paid in two years. Assuming a discount rate $r$, the prepayment would be:

$$P_0 = \frac{p_1}{(1+r)} + \frac{p_2}{(1+r)^2}$$

Now, assume that the only known numbers are $p_0$ and $r$. In that case, the above equation is a single equation with two variables. There are, in general, an infinite number of solutions to such a problem. In Example 9, it is further assumed that $p_1 = p_2$. In such a case, there are now two equations containing two unknowns, and a unique solution generally exists.
Put most simply, the problem is allocating the purchase price of the pair of bets between the two bets. The correct answer is obtained only when the allocation is by fair market value. While making a fair market valuation may not be easy, it needs to be done only once. Moreover, the valuation will only have to be performed at the time the transaction is entered into, rather than at later, arbitrary times. Furthermore, the allocation is no different in kind than the allocation that must be made any time a person purchases a set of assets for a single price, such as in the purchase of a business.  

The previous example demonstrated that when there is more than one bet and there is a prepayment, it is not possible to determine from the terms of the bets the correct treatment of the individual bets. As demonstrated in the following example, the amounts paid for each individual bet may not represent the correct price for each bet even where there appears to be no prepayment.

4. Example 10: Hidden Prepayment.—Assume that the odds for the next two elections are still 4-to-1 and 3-to-1, respectively. Nevertheless, assume that we agree to bet on both elections, using the odds of 3.54-to-1 for both bets. In particular, I agree to pay you $1130 for each Republican victory, and you agree to pay me $4000 for each Democratic victory.

While neither of the bets by themselves are fair, the two bets taken together are fair. In other words, the present value of the expected payoffs is zero. Essentially, I am agreeing to overpay you for the first election in exchange for underpaying you for the second election. The correct treatment of the pair of bets depends on knowing the prices for the two individual bets.  

251. To say that such an allocation has to be performed elsewhere is not to minimize the difficulty of such an allocation. The allocation of purchase price in the context of a business allocation is a theoretically simple, but administratively complex area of the tax law. See infra text accompanying notes 372-79 for further discussion of the difficulty of such an allocation in the context of financial instruments and of current rules in the tax law requiring similar allocations.

252. More generally, assume, following supra note 250, that the correct forward prices are $p_1$ and $p_2$. There is essentially an infinite set of pairs of prices $p_1'$ and $p_2'$ such that the present value of the pair $\{p_1', p_2'\}$ is equal to the present value of the pair $\{p_1, p_2\}$. In particular, any pair $\{p_1', p_2'\}$ has the same present value as $\{p_1, p_2\}$, so long as:

$$
\frac{p_1'}{(1 + r)} + \frac{p_2'}{(1 + r)^2} = \frac{p_1}{(1 + r)} + \frac{p_2}{(1 + r)^2}.
$$

The set of solutions to this equation is saved from being infinite only if additional constraints are imposed.
in the first election is twenty percent. Therefore, the correct price for the first bet is $1026. The first payment, therefore, should be viewed as a payment of $1026 for the first bet and a prepayment of $104 for the second bet. In the case of a Republican victory, therefore, I should have a loss of only $1026, rather than the full $1130 payment. At the same time, I should have a basis of $104 in the second bet. During the next four years, I should have approximately $48 of imputed income on the second bet. At the time of the second election, I will pay an additional $1130 for a total basis of $1282, the correct forward price for the second bet.

Thus, it does not matter whether or not payments are made at the time that the uncertainties are resolved or in advance of their resolution. As long as there is more than one uncertainty, it is necessary to determine the correct forward price for each uncertainty in order to determine the proper timing of income.

VII. An Application of the Expected Value Approach to Typical Financial Instruments

The advantages and disadvantages of expected value taxation were explored in Part VI using a series of hypothetical wagers. In this Part, expected value taxation is further developed by applying the approach to a selection of actual financial products.

A. Cash-Settlement Forward Contracts

1. Description of a Cash-Settlement Forward Contract.—A forward contract is a two-party executory contract wherein one party agrees to buy specified property, and the other party agrees to sell such property at a specified price on a specified delivery date. Payment for the property is generally made at the time of transfer. A cash-settlement forward contract is a forward contract that is settled in cash, rather than by delivery of the underlying good.
2. Proposed Taxation of a Cash-Settlement Forward Contract.—A forward contract involves only a single contingency, the price of the underlying commodity on the delivery date. Accordingly, it should be treated as a single instrument for timing purposes. The second step requires determining the expected future price of the forward.\textsuperscript{261} There are at least two approaches for determining an expected future price for timing purposes. First, at least in theory, it would be possible to try to determine the true expected value of the future price.\textsuperscript{262} Second, it would be possible to use the market forward price. In a competitive equilibrium in a risk-neutral world, the forward price of an asset must equal the expected future price. If the forward price for a commodity were less than the expected future price, an expected profit could be made by purchasing the commodity forward, taking delivery at maturity, and then selling the commodity in the spot market. Given the assumption of risk-neutrality, such transactions would be carried out until the forward price was driven up to the expected future price. Therefore, in a risk-neutral world, the use of either the forward price or the expected future price would give the same answer.

In a world where people are risk averse (or risk-preferring) expected future prices will generally differ from forward prices. For example, a risk-averse potential purchaser of the commodity will be willing to pay a premium over the expected future price, while a risk-averse potential seller of the commodity will be willing to sell for less than the expected future price. Thus, even in equilibrium, forward prices will generally differ from expected future prices.

Nevertheless, I believe that forward prices are the appropriate prices to use for purposes of determining expected future prices for tax purposes. The primary argument in favor of forward prices is administrative. Determining true expected prices is administratively impractical. Forward prices provide a reasonable proxy for expected future prices at far lower administrative cost.\textsuperscript{263}

\textsuperscript{261} The expected value of a forward contract at maturity is equal to the contract valued at the expected price of the underlying commodity. Thus, the expected future value of the contract and the expected future price of the underlying commodity can be used essentially interchangeably. \textit{Cf. infra note 393} (noting that the expected value of an option is not equal to the option valued at the expected price of the underlying commodity).

\textsuperscript{262} Of course, it would be necessary to ask whose expectation: the buyer’s, the seller’s, or the “market’s.” Presumably, as discussed above, it should be the market’s expectation that counts.

\textsuperscript{263} In a competitive equilibrium, given the spot price and the cost of carrying a commodity,
A second argument can also be made for using forward prices rather than expected future prices. Consider a forward contract to purchase an asset that is currently selling for $100 and offers no current return. Assume that because of the risk characteristics of the asset it is expected to yield an eighteen percent return at a time when the risk-free interest rate is ten percent. In that case, the one-year forward price of forward prices can be determined mechanically without regard to expected future prices. The spot price is the current price for current delivery of the good. The cost of carrying always includes the opportunity cost of the funds used in purchasing the good on the spot market and also includes such costs as storage and insurance. Carrying costs are negative to the extent that the good generates a current return. If the current return is large enough, total carrying costs can be negative and the future price will be less than the spot price. Markets where the forward price is less than the spot price are often referred to as being in backwardation. See 2 John Maynard Keynes, A Treatise on Money 142-44 (6th ed. 1960).

In equilibrium, it must be the case that the one-year forward price for silver is $11 per ounce. Should the forward price for silver exceed $11, riskless arbitrage profits could be made by purchasing silver in the spot market and selling it in the forward market. These purchases and sales would drive up the spot price and lower the forward price until they met the condition that forward prices equal spot prices plus the cost of carrying the commodity. Similarly, if the forward price was less than $11, riskless arbitrage profits could be obtained by selling silver short in the spot market and purchasing silver in the forward market.

Given the fact that forward prices can be determined mechanically from the spot price and the carrying costs for the commodity, it might be concluded that forward prices are independent of expected future prices. If forward prices were independent of expected future prices, the argument for using forward prices as a proxy for expected future prices would be severely weakened. Fortunately, the relationship between spot and forward prices does not demonstrate that forward prices are independent of expectations, but rather that spot and forward prices are not independent of each other. They are, in fact, both dependent on expectations about the future demand and supply for the commodity. Gerald Gold, Modern Commodity Futures Trading 30, 54 (6th ed. 1971). In equilibrium, if you know the forward price, no additional information about expected future prices can be gleaned from the spot price and vice versa. Knowing either the spot or the forward price, however, provides information about expected future prices. See infra text accompanying note 383 for a suggestion that forward prices may be estimated by use of the spot price plus the cost of carry.

The proof that in equilibrium the forward price of a good must be equal to its spot price plus carrying costs is an arbitrage proof that requires the ability to transfer the good between periods. Thus, the forward price of a good cannot be in excess of the spot price plus carrying costs as long as it is possible to purchase the good in the spot market and hold onto it until the forward contract matures. If the good in question is gold, an arbitrageur is able to purchase gold in the spot market and hold it for delivery in the forward market. If, on the other hand, the good is fresh raspberries, it would generally not be possible to carry the good from the spot market to the forward market and, therefore, the forward price may exceed the spot price. For example, in August, fresh raspberries may sell for $1 per pint while at the same time fresh raspberries for December delivery may be $6 per pint (representing the expected cost of importing raspberries from Chile). See Gold, supra, at 31-34.

Similarly, the forward price may be less than the spot price plus carrying costs when it is not possible to borrow the good now for spot delivery. Again, using gold, an arbitrageur is able to borrow gold for delivery into the spot market, later taking delivery in the forward market to return the borrowed gold. On the other hand, if it is not possible to borrow the commodity, the forward price can be sustained at less than the spot price plus carrying costs.

See Brealey & Myers, supra note 18, ch. 8 (describing the relationship between the riskiness of an investment and its expected return).
the asset would be $110, while the expected future price would be $118. Assuming a fifty percent tax rate, under a mark-to-market system, the expected tax liability of the holder of the forward would be $9, fifty percent of the expected income of $18. On the other hand, consider the current market price of the future tax payment—the amount that someone would currently agree to pay in one year in exchange for the tax liability of the holder of the forward contract. The market price for the future tax payment would have to be $5. If the price were more than $5, it would be possible to make a certain arbitrage profit by selling the tax payment and purchasing one-half of a forward contract on the asset. Conversely, if the price of the future tax payment were less than $5, the purchaser of the tax payment could make an arbitrage profit by purchasing the tax payment and selling one-half of a forward contract. Thus, in a mark-to-market world, the future tax payments would be priced based on the forward price for the asset, not the expected future price. Therefore, a mark-to-market system is arguably best approximated using the forward price rather than the expected future price. Assuming that the forward contract was entered into at the market forward price, the best estimate for tax purposes of the expected future value of the forward contract is zero. Therefore, there should be no accrual of income prior to maturity. At maturity, the parties should have income and loss equal to the amount required to be paid under the contract.

3. Example 11.—Diva enters into a cash-settlement forward contract with David to purchase 10,000 ounces of silver in two years at $12 per ounce. When the contract matures, the spot price of silver is $14.50 per ounce. David pays Diva $25,000.

Example 11 involves a single forward contract at the market price. Accordingly, as under current law, there should be no income imputed to either party prior to maturity. At maturity, Diva should include $25,000 in income and David should be permitted an equal loss. While the on-market forward contract in Example 11 offers no anticipated deferral,
it offers unanticipated deferral, and, therefore, the timing option, to the extent that the forward price varies over the term of the contract.

The timing option is made worse in the case of forward contracts that can be settled in property. In such cases, because exercise is not considered to be a realization event, the forward purchaser can continue to defer any gain beyond the life of the contract by exercising her right to settle in the underlying property. The timing option could be limited in such cases by treating exercise of the forward contract as a realization event. Treating exercise as a realization event would require valuing the underlying property as of the exercise date, but would not require valuation of the forward contract as such.

B. Cash-Settlement European Options

1. Description of a Cash-Settlement Option.—A call option is a contract that gives the holder the right, but not the obligation, to purchase specified property at a specified price (the "strike price") at a specified time (the "strike date"). A put option gives the holder the right, but not the obligation, to sell rather than purchase specified property. As defined, an option confers a valuable right without any offsetting obligation, and, therefore, always has a positive value. An option premium, which is generally paid upon entering into the contract, serves as payment for this value.

268. Cf. id.
269. Note that § 1256(c) requires gain recognition on exercise of a futures contract subject to § 1256(a). See I.R.C. § 1256 (1988).
270. If the property is the subject of the forward contract is a publicly traded asset, the administrative cost of valuing the asset at the time of purchase should be small. If the property is not publicly traded, the administrative cost of valuation could be prohibitive.
271. See BREALEY & MYERS, supra note 18, at 485 (defining a call option). The foregoing is a description of a European call option. In the case of an American option, the holder has the right to exercise the option at any time until and including the strike date. See infra subpart VII(C) for a discussion of American options.
272. See BREALEY & MYERS, supra note 18, at 485-86 (distinguishing call and put options).
273. The value of the option may be arbitrarily close to zero, but as long as there is the possibility of price movement, the value should be positive.
274. See Thomas A. Russo & Mariisa Vinciguerra, Financial Innovation and Uncertain Regulation: Selected Issues Regarding New Product Development, 69 TEX. L. REV. 1431, 1432 n.2 (1991). In a present value sense, there is no significance to the time the option premium is paid as long as the amount of the premium is adjusted for the time value of money. In fact, a forward contract is equivalent to a call option with a zero strike price for which the premium is generally paid at exercise. The principal effect of shifting the time that the premium is paid is to allocate credit risk between the parties. If, for example, the premium is payable at the strike date, the option plus the obligation to pay the premium can have a negative value. Unless specified otherwise, I assume that any option premium is paid at the time that the option contract is made.
2. Proposed Taxation of a Cash-Settlement Option.—As with a forward contract, an option contract involves only a single contingency, the price of the underlying good at the exercise date. Accordingly, it should be treated as a single instrument for timing purposes with the only realization event occurring at exercise, or expiration, of the option. The more difficult question is determining whether any expected income or loss occurs during the term of the option and, therefore, whether any income or loss should be accrued during the term. An option is fundamentally no different from the bet in Example 6.275 In Example 6, one party to the bet has prepaid its obligation under the bet. Similarly, an option can be viewed as a bet where one side has prepaid its obligation.276

In Example 6, the amount of the prepayment was equal to the present value of the expected return from the bet. Similarly, with an option the premium is equal to the present value of the expected return from the option.277 Just as with the bet, the payor of the option premium should accrue income in each period equal to the change in the expected value of the option, which is assumed to be measured by its forward price.278 Given that the carrying cost of an option is generally limited to the interest cost of the premium, the expected value can be estimated by assuming that the value of the option increases by an appropriate interest factor.279 Similarly, the writer of the option should be entitled to accrue a deduction over the same period. Any accrual should be added to or subtracted from basis, and at maturity the purchaser and the writer of the option should have income and loss measured against their respective adjusted bases.

275. See supra text accompanying note 230. The finance literature has recognized the equivalence between an option and many other financial instruments. For example, debt of a corporation can be viewed as a purchase of the assets of a corporation by the debt holder along with a sale by the debt holder to the stockholders of a call option on the same assets with a strike price equal to the face amount of the debt. See, e.g., COX & RUBINSTEIN, supra note 61, at 376; BREALEY & MYERS, supra note 18, at 582.

276. By "prepaid" I mean only that the payment is made prior to the time that the underlying contingency is resolved. The fact that the premium on an option is normally paid at the time the contract is entered into has nothing to do with the question of whether the premium is prepaid as the term is used here.

277. To be exact, the value of an option is equal to its discounted expected future value in a risk-neutral world. See John C. Cox & Stephen A. Ross, The Valuation of Options for Alternative Stochastic Processes, 3 J. FIN. ECON. 145, 164 (1976).

278. See supra section VII(A)(2) (arguing that the forward price is the best measure of future value).

279. Cf. Committee on Financial Instruments, New York State Bar Ass'n, Report on Tax Accounting for Notional Principal Contracts, Tax Notes Today, Oct. 18, 1989, available in LEXIS, FedTax Library, TNT File (discussing alternative methods of amortizing cap premiums and concluding that the method recommended in the text is incorrect and that "economic amortization" or "market accrual" should be used instead). For a more complete discussion of this point, see infra Appendix A.
3. Example 12.—Diva enters into a cash-settlement call option with David to purchase 10,000 ounces of silver in two years at $12 per ounce. Diva pays David $10,000 for the option. The contract matures at a time when the spot price of silver is $14.50 per ounce. David pays Diva $25,000.280

Diva has purchased an asset for $10,000 which she is presumed to expect to increase in value to $11,000 by the end of the first year and to $12,100 by the end of the second year. Diva should accordingly have income of $1000 in the first year and $1100 in the second year. Diva’s basis in the option as of the end of the second year should be $12,100. At maturity, Diva should have income of $12,900. David’s tax treatment should be the opposite of Diva’s.

In general, under current law, both the holder and the writer of an option have no income or deduction prior to the exercise or expiration of the option.281 Thus, under both current law and my proposal there is a timing option to the extent that the price changes between the time of purchase and the maturity of the option.282 The difference between the two approaches is that current law fails to tax anticipated deferral.

4. Cash-Settlement American Options.—The discussion so far has assumed that the option is a European option, exercisable only at maturity.283 To what extent would the analysis change if the option was an American option, exercisable at any time prior to maturity?284 To begin with, it is useful to note that the difference between the two types of options is less than might appear. One of the standard conclusions of option pricing theory is that, in the absence of taxation and under certain reasonable assumptions, an American call option will never be exercised prior to maturity, and therefore is de facto equivalent to a European call option.285 In particular, consider an American option to purchase a

280. $25,000 is the difference between the spot price and the strike price multiplied by 10,000 ounces.
281. See supra note 118.
282. As with a forward contract, the timing option is greatly increased if the call option can be settled in property rather than cash. In that case, the holder of the option can delay recognition of gain beyond the maturity of the option by exercising the option and holding onto the underlying property. See supra note 118. A put option does not offer the same flexibility, because settlement of a put involves the sale, not the purchase, of property and will, therefore, generally trigger recognition of taxable income.
283. European options are more likely to be used as building blocks in certain types of financial instruments, including interest rate caps, hybrid debt instruments, and convertible debt where the conversion right can only be exercised at maturity. On the other hand, convertible debt where the conversion right may be exercised at any time prior to maturity is similar to conventional debt plus an American call option where the exercise price of the option is the current value of the debt.
284. Similar comparisons could be made between a forward contract exercisable only on a particular date and a forward contract that could be exercised by one or both parties prior to maturity.
285. See, e.g., COX & RUBINSTEIN, supra note 61, at 141 (“[A]n American call on a stock paying
specified commodity for a fixed price at any time through time \( t \). Assume that there are no costs or benefits to owning the commodity other than the purchase price and the return from sale.\(^{286}\) In that case, it will never be optimal (i.e., profit maximizing) to exercise the option prior to maturity.\(^{287}\)

Therefore, under the assumption that the opportunity to exercise the option prior to maturity has no value, the value of the American call option should be equal to the value of the equivalent European call option. This equivalence holds true under both a full accrual and a pure realization tax system. Under a full accrual system, the holder of an American option contemplating exercise will have already taken into account any gains or losses with respect to the option. The holder, therefore, has no incentive to exercise or not exercise the option based on accrued gain or loss. Similarly, future gain or loss on either the option or the underlying commodity will be recognized as it accrues, regardless of the form of ownership. Accordingly, the prospect of future taxation will not affect the decision to exercise the option.\(^{288}\)

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no dividends should never be exercised prior to the expiration date." (emphasis in original)).

286. Thus, for example, there are no rental receipts, consumption values, or voting rights that follow from ownership of the commodity. Similarly, there are no insurance or storage costs of ownership. Under these assumptions, the only reason to exercise the option is to take advantage of increases in the price of the commodity. Assume also that there are no carrying costs to the option other than the foregone return on the investment. When these conditions are not met, the value of an American option exceeds the value of a European option. See generally Joon Kim, The Analytic Valuation of American Options, 3 REV. FIN. STUD. 547 (1990) (offering an analytic solution to the value of an American call option on an asset paying a continuous return).

287. The statement in the text can be proved by the following argument. Assume that the strike price is \( p_c \) and that the current price of the commodity is \( p_c \). If \( p_c < p_c \), it would be cheaper to purchase the commodity on the open market and therefore the option should not be exercised. Now, assume that \( p_c \geq p_c \). Consider two possibilities. First, assume that the holder believes that \( p_c \) will remain constant or increase in the future. In that case, there is no advantage to exercising the option and holding the commodity as compared to simply holding the option. In either case, the holder will ultimately realize the increase in the commodity price. Moreover, by exercising the option the holder loses the opportunity to earn interest on the strike price and risks losing the additional investment of \( p_c \) to the extent that the commodity price declines below \( p_c \). By merely holding the option, the holder captures any increase in the commodity price without bearing the risk that the commodity price will decline below \( p_c \).

In the alternative, assume that the holder believes that \( p_c \) will decline in the future. In that case the holder will be no worse off selling the option than she would be if she exercised the option and then sold the commodity, because the option value cannot be less than the difference between the commodity price and the strike price. Thus, it will never be optimal to exercise the option prior to maturity. And because it is never optimal to exercise the option prior to maturity, there is no de facto difference between an American and a European option. See BREALEY & MYERS, supra note 18, at 526 (noting that "since an American call option should not be exercised before maturity, its value is the same as that of a European call, and the Black-Scholes formula applies to both options").

288. Of course, the decision to invest in the option in the first place or to continue the investment may well be affected by taxation. The point is that the decision to retain the option rather than exercising it and holding the commodity is unaffected.
Similarly, the incentive to exercise or hold a call option will be unaffected by a realization-based tax system. Neither exercising nor holding the option will trigger recognition of income under such a system. Accordingly, while a holder may be encouraged to sell the option to recognize a loss or to hold onto an option to defer gain, the holder has no tax-based incentive to exercise or not exercise the option prior to maturity. In particular, if the holder wishes to terminate her investment in the option (or the underlying commodity), she has no tax incentive to exercise the option and then sell the commodity, rather than simply selling the option. Similarly, if the holder wishes to continue her investment and the option has appreciated in value, she will have no tax incentive to exercise the option and hold the commodity, rather than simply hold the option. If the option has depreciated in value and she wishes to recognize the loss, she can sell the option and purchase the commodity on the market. Thus, the holder has no incentive to exercise an American call option prior to maturity under either a full accrual or a realization-based system.

Because the value of an American call option is the same as the value of a European call option under the limiting conditions specified above and because the two types of options will generally be exercised under the same set of circumstances, it is reasonable to have the same rules for taxation of the two options. The utility of this conclusion is, of course, limited by the underlying assumptions—primarily the assumption that there is no benefit to direct ownership of the underlying commodity or other property that is the subject of the option. Obviously, there are many cases for which this assumption is not true. For example, gold may have a positive rental value, and corporate shares generally have both dividend and voting rights. Nevertheless, in a broad class of cases the result continues to hold.

289. She could also sell the option and purchase a new option.

290. American and European call options are not of equal value under all conceivable tax systems. It is likely, however, to hold under reasonable combinations of a full accrual system and pure realization system. For example, consider a modified realization system under which the exercise of an option is a realization event. The holder of a depreciated American option could recognize her loss by exercising the option. At first glance this would suggest that she might choose to do so. She could, however, also trigger her loss by selling the option and purchasing the underlying commodity. Moreover, the latter course should be more valuable for the same reasons that it is generally not optimal to exercise an American option prior to maturity. See supra text accompanying notes 285-87.

291. While under the conditions described above an American call option is equivalent to a European call option, a similar equivalence does not hold between an American put option and a European put option. The basis of the equivalence for call options is that it is never optimal to exercise an American call option before maturity. It may, however, be optimal to exercise an American put option before maturity. Consider, for example, an American option to sell stock in X for $100 at any time during the next 60 days. Assume that after 30 days X is bankrupt and its stock is worthless. The put is worth $100 if exercised at that time. If, on the other hand, the put is held until maturity, the most it can be worth at maturity is $100. Assuming a positive interest rate, it is more valuable to exercise the put immediately. See Robert Geske & H.E. Johnson, The American Put Option Valued
On the other hand, the equivalence of American and European call options does not hold once the option is combined with other rights or obligations that cannot be transferred independently because they are part of the same overall instrument. Consider, for example, a cash-settlement option to buy one ounce of gold in one year at $100 combined in a single instrument with a second cash-settlement option to purchase ten ounces of silver at the same time for $10 per ounce. Assume that the options cannot be transferred independently. Under these circumstances it may well be in the interest of the holder to exercise one option and continue to hold onto the other. Assume, for example, that the prices of gold and silver are currently $125 and $9 respectively. Assume further that the holder expects the price of gold to drop and the price of silver to rise. In that case, it may well be optimal to exercise the gold option currently while continuing to hold the silver option. The holder can only do so if the gold option is an American option.\textsuperscript{292}

Assuming that under some circumstances American options are different from European options, the question remains whether there is any reason to treat them differently for tax purposes. The answer is generally no. The argument in favor of waiting until a European option is sold or matures is not based on the holder's inability to exercise the option prior to maturity, but rather on the difficulty in valuing the option prior to maturity or sale. Whether or not an American option will be exercised prior to maturity, in the absence of such an exercise there is no reason to believe that the valuation question is any easier than with a European option.\textsuperscript{293} Accordingly, absent a premature exercise of the option, there would not appear to be any reason to accrue income any differently with respect to an American, as opposed to a European, option. If, on the other hand, the American option is in fact exercised prior to maturity, that would appear to represent a good opportunity for realization of any gain or loss, just as it is appropriate to recognize gain or loss when the option is exercised at maturity.\textsuperscript{294}

\textsuperscript{Analytically,} 39 J. Fin. 1511, 1511 (1984) (providing an analytical valuation formula for an American put option).

\textsuperscript{292}. Even in the case of paired call options (gold and silver in the text), the holder has alternatives other than exercising one option while continuing to hold the second option. For example, the holder could sell the pair of options and then enter into a replacement call option for silver. Alternatively, she could write a call option on gold. Finally, she could purchase a put on gold. In any case, she will have achieved the desired result of realizing on the gain from the gold option while maintaining an open position in silver. The optimal course may well be determined by relative transaction costs.

\textsuperscript{293}. Both American and European options may be traded under a system in which daily gains and losses are marked to market. In such a case the valuation problem is solved, and the justification for not using a full accrual system is seriously undermined. The existence of a mark-to-market trading system was one of the principal factors that led to the adoption of \textsection 1256. See Staff of Joint Comm. on Taxation, supra note 64, at 296.

\textsuperscript{294}. In the case of a cash-settlement option, taxing an American option at exercise is
C. Fixed-for-Floating Interest Rate Swap

1. Description of a Fixed-for-Floating Interest Rate Swap.—A fixed-for-floating interest rate swap is a contract between two parties whereby one party agrees to make periodic payments to a second party (the "counterparty") equal to a fixed interest rate (the "swap rate") times a specified principal amount, and the counterparty agrees to make payments to the first party equal to a variable interest rate times the same principal amount. The payments are generally netted. The specified principal amount is used only to determine the amount of the swap payments and is not actually borrowed or lent. Because the specified principal is generally used only to measure the parties' payments and is not actually transferred between the parties, it is often referred to as a "notional" principal amount and swap contracts are referred to as notional principal contracts.

A swap contract may or may not require an initial payment by either party. Such a payment is required when the present value of the expected future payments on one leg of the swap is not equal to the present value of the expected payments on the other leg of the swap.

2. The Economics of a Swap.—Economically, a swap contract is equivalent to a series of cash-settlement forward contracts on short-term loans. Consider, for example, a contract to borrow $1000 in one year for uncontroversial and relatively inescapable. See supra note 119. In the case of an option settled in property, it would be an acceleration of realization in comparison with current law. For more discussion of this point, see supra note 282; supra text accompanying note 270.

295. See Henry T.C. Hu, Swaps, the Modern Process of Financial Innovation and the Vulnerability of a Regulatory Paradigm, 138 U. Pa. L. Rev. 333, 347 (1989) (describing the swap as an exchange of cash flows). More generally, an interest rate swap is a contract between two parties where each party agrees to pay the other party interest on a specified principal amount according to a specified formula. Id. at 347.

296. See id. at 348 n.42 (1989).


298. A swap that does not require any up-front payment is often referred to as an on-market swap. A swap that requires an up-front payment is often referred to as an off-market swap. See 26 C.F.R. § 1.988-2(e)(3) (1992) (describing an off-market currency swap); Prop. Treas. Reg. § 1.446-3(e)(4)(v) example 4, 56 Fed. Reg. 31350, 31360 (1991) (showing an off-market interest rate swap).

299. See 26 C.F.R. § 1.988-2(e)(3) (1992). For example, assume that the market rate for a five-year annual-pay LIBOR (London Interbank Offered Rate) swap is 10%. In other words, market participants are willing to enter into swaps where they will pay LIBOR times a notional principal amount in exchange for 10% of the notional principal amount. If a party wished to enter into a swap at 9% she would be required to make an up-front payment equal to the present value of 1% (10% minus 9%) of the notional principal amount per year for five years. Similarly, if she wished to enter into a swap at 12%, she would receive an up-front payment equal to the present value of 2% of the notional principal amount per year for five years.
a term of one year at an interest rate of ten percent. Such a contract is simply a forward contract for a loan with a forward price of $100 (or ten percent). Consider now a cash-settlement version of the above contract. Assume that at the time of settlement, the rate for one-year loans is eleven percent. In that case, the forward borrower would need an additional one percent over and above the contract rate of ten percent in order to borrow the funds in the market. The amount payable under a cash-settlement forward contract would, therefore, be one percent times the stated principal amount of the contract or $10. The receipt of the $10 is sufficient to permit the forward borrower to obtain a market loan at eleven percent or $110, while paying a net interest cost equal to the contract rate of ten percent or $100. The payment of $10 under the cash-settled forward contract, however, is exactly the same payment that would be required under an equivalent one-period swap contract. Thus, a one-period swap contract is functionally indistinguishable from a cash-settlement forward contract at the swap rate. Similarly, a multiperiod swap contract (i.e., a standard swap contract) is functionally indistinguishable from a series of cash-settlement forward contracts each at the swap rate.

The fact that the swap rate is constant means that the parties have agreed to a constant forward price (i.e., interest rate) for the series of short-term loans. Assuming that the term structure of interest rates is not flat (i.e., that interest rates on short-term loans are different than interest rates on long-term loans), a constant swap rate means that the parties have agreed to overpay for certain loans in exchange for underpaying for other loans. Thus, for example, consider the interest rates shown in Figure 1.

300. For simplicity, I ignore the difference between a payment made at the beginning and the end of the loan period.
301. A cash-settlement contract is a contract that is settled in cash, rather than by delivery of the underlying good (here the use of the money). See supra section VII(A)(1).
302. The discussion in the text ignores the difference between the risk of changes in market interest rates and the risk of changes in the borrower's credit worthiness. A forward loan contract would generally transfer both risks to the forward lender, while a cash-settlement forward loan contract would only transfer the risk of changes in market interest rates. If the forward borrower's creditworthiness deteriorates during the interim period, its net cost of borrowing would be expected to increase. Of course, the forward borrower can eliminate the risk of a decline in its creditworthiness by entering into a separate forward borrowing contract at a variable rate (i.e., a market rate to be determined at the time of borrowing). One of the advantages of having swap and forward interest rate markets is that it enables such a separation of credit and interest rate risks.
The curve marked Yield Curve is a hypothetical zero-coupon yield curve.\footnote{303} The curve marked Forward Rate Curve represents the associated forward rate curves.\footnote{304} The forward rates range from approximately 10 percent to approximately 16.5 percent. Thus, if the parties entered into a series of forward borrowing agreements, each at the respective market rate, the forward contracts would call for interest rates beginning at approximately ten percent in one year and increasing to approximately sixteen percent for the final loan in ten years. On the other hand, if the parties wished to have the same rate for all of the forward agreements, in order to maintain the same overall cost of the loans they

\footnote{303} For example, the point at the coordinates (4, 10.9) indicates that a four-year zero-coupon bond would yield 10.9\%. A zero-coupon yield curve differs from an ordinary yield curve in that each point represents the yield on a zero-coupon bond, rather than a coupon-paying bond. The yield curve is often referred to as the term structure of interest rates. See Burton G. Malkiel, The Term Structure of Interest Rates: Expectations and Behavior Patterns 1-2 (1966) (describing the “functional relationship among yields of securities which differ only in their term to maturity” as “the term structure of interest rates,” and stating that the yield curve is the most widely used graphic device for examining this relationship). The steepness of the yield curve has been exaggerated for clarity of presentation.

\footnote{304} That is, the set of forward rates on one-year loans consistent with the yield curve. For example, the point at the coordinates (3, 14.0) indicates that the three-year forward rate for a one-year loan is 14.0\%. See Appendix B for a discussion of the relationship between the yield curve and the forward rate curve.
would set a rate at the level such that the overpayment in the early years (along with interest on such overpayment) would offset the underpayment in the later years. In other words, the rate would be selected such that the present value of the overpayments is equal to the present value of the underpayments. At such a rate, each of the individual forward contracts would generally be priced off-market. Only the package of forward contracts taken as a whole would be a market transaction. Thus, the market swap rate is essentially an "average" of a series of off-market forward rates. In this example, the swap rate is approximately fourteen percent.

3. Proposed Taxation.—As discussed above, a swap is similar to a series of cash-settlement forward contracts. As such, it is appropriate to treat each forward contract as generating a separate realization event. Thus, for example, gain on the one-year forward contract should be recognized at the end of the first year; gain on the two-year forward contract should be recognized at the end of the second year; and so forth. The complication arises in determining the amount of gain with respect to each forward contract. As long as the term structure of interest rates is not flat, each of the forward contracts will have been priced off-market. In order to determine the amount of gain with respect to each component, it is necessary to know the price of that component. To the extent that the swap rate differs from the market forward rates, any underpayment or overpayment should be treated as an amount paid with respect to other periods. The parties should not have any income or loss from such payments on future or past forward contracts at the time of payment on presently matured forward contracts. In addition, because such overpayment and underpayment are essentially loans, the parties should be required to accrue income or expense with respect to the resulting loans. In essence, such a swap contract presents the same issues as

305. See infra Appendix B (deriving an exact formula to determine the appropriate rate).
306. More precisely, in a competitive equilibrium, the swap rate is a weighted average of forward rates.
307. See supra text accompanying notes 300-04.
308. This discussion assumes the parties have agreed to a single swap rate for the entire term of the contract.
309. The principal on this mini-loan should not be confused with the underlying notional principal amount for the swap contract. The principal amount on the mini-loan is the accumulated difference between the swap rate and the market forward rate multiplied by the notional principal amount. The use of the term "loan" is meant to help clarify the fact that the income flows from the swap contract. It is not meant to suggest that some portion of the swap income or expense should be characterized as interest income or expense for federal income tax purposes. The desirability of such a characterization depends on a multitude of factors beyond the scope of this Article.
does the series of off-market bets in Example 10, and should be taxed in the same manner.\textsuperscript{310} It should be noted that the proposed treatment of swaps is inconsistent with the current tax treatment of long-term fixed-rate debt. Just as a swap is equivalent to a series of cash-settlement forward contracts for short-term debt, fixed rate debt is equivalent to a series of noncash-settlement forward contracts on short-term debt. Thus, for example, ten-year debt at eleven percent can be viewed as a one-year loan followed by a series of nine forward contracts for additional one-year loans, each priced at eleven percent. Viewed in such a fashion, it becomes obvious that, in general, each of the individual short-term obligations is mispriced because the contract rate is not the series of market forward rates, but rather a blended rate for the package.\textsuperscript{311}

4. Example 13.—Diva enters into a two-year interest rate swap with David. Under the terms of the swap, Diva agrees to pay David the swap rate (a fixed rate) times a notional principal amount of $1000 at the end of each year in exchange for a payment of the prime rate (a variable rate) times the same amount. At the time that they enter into the contract, prime for one-year loans is ten percent, the one-year forward rate for prime is eleven percent, and the two-year forward rate is twelve percent.\textsuperscript{312} Given current spot and forward interest rates, Diva and David set a swap rate equal to 11.47 percent. At the end of the first year, prime is 11.2 percent and Diva makes a net payment of $2.70.\textsuperscript{313} At the end of the second year, prime is 11.8 percent and David makes a net payment of $3.30.

Under expected value taxation, in order to determine the timing of income on the swap contract it is first necessary to determine the market forward interest rates, here assumed to be eleven percent and twelve percent for the first and second years, respectively. Based on the forward rates, the swap agreement would be treated as requiring a payment of eleven percent for the first year along with an advance payment of 0.47

\textsuperscript{310} See supra section VI(B)(4).

\textsuperscript{311} See Joseph Bankman & William A. Klein, Accurate Taxation of Long-Term Debt: Taking into Account the Term Structure of Interest, 44 TAX L. REV. 335, 335-36 (1989) (noting that the current taxation of long-term debt is inconsistent with the term structure of interest rates); see also Bruce Kayle, Where Has All the Income Gone? The Mysterious Relocation of Interest and Principal in Coupon Stripping and Related Transactions, 7 VA. TAX REV. 303, 324-32 (1987) (discussing the potential mismeasurement of holders' income from stripped bonds).

\textsuperscript{312} The forward rates are equivalent to rates on two-year and three-year fixed-rate loans of 10.50\% and 11.00\%, respectively.

\textsuperscript{313} $2.70$ is the difference between the swap rate and prime, multiplied by the notional principal amount.
percent for the second year. At the end of the first year Diva would, therefore, be treated as having received a payment of $2.00 under the first forward contract and as having made an advance payment of $4.70 under the second forward contract. Accordingly, despite the fact that Diva will have made a net payment of $2.70, she would have taxable income of $2.00. She will also have a basis of $4.70 in the remaining swap contract.

Based on the forward rate of twelve percent for the second period, Diva expects to receive a payment with respect to the second forward contract of $5.30 at the end of the second year. Therefore, Diva should accrue an additional $0.60 in income during the second year. Diva's basis in the swap at the end of the second year would, therefore, be $5.30. Upon receipt of the final cash payment of $3.30, she would have a taxable loss of $2.00.

5. The Treatment Under Current Law.—Under the proposed notional principal contract regulations, both parties to the swap would be treated as having taxable income or loss in each period equal to the amount they pay or receive in that period. Under the regulations, therefore, Diva would have a deduction at the end of the first year equal to the $2.70 that she paid and would have income equal to the $3.30 that she received at the end of the second period.

6. Resolving the Discrepancy Between the Proposed Taxation of Swaps and the Taxation of Fixed-Rate Debt.—As noted, the treatment of swaps under the expected value approach is inconsistent with the treatment of long-term fixed-rate debt. Given that it is unlikely that the treat-

314. $2.00 is the product of the notional principal amount times the difference between prime (11.2%) and the forward rate (11.0%).
315. $4.70 is the product of the notional principal amount times the difference between the swap rate (11.47%) and the forward rate (11.00%).
316. $5.30 is the product of the notional principal amount times the difference between the forward rate for the second period (12.00%) and the swap rate (11.47%).
317. $0.60 is the difference between the expected value of the contract at the end of the year and her basis at the beginning of the year. $0.60 is also approximately her basis ($4.70) times the forward rate of 11 percent. The difference between $0.60 and $0.52 (11% x $4.70) is caused by a round-off error in the selection of the swap rate. The precise swap rate is closer to 11.4739%. At that rate, her basis after the first year would be $4.74 and the expected value at the end of the second year would be $5.26. The difference of $0.52 between these two figures is equal to her basis of $4.74 times the forward rate of 11 percent.
318. $5.30 is the sum of the prepayment ($4.70) plus the amount accrued during the second year ($0.60).
320. See supra text accompanying note 311.
ment of long-term debt will be changed, consistency suggests that the expected value approach is inappropriate as applied to swaps. 321

In most cases, it is probably preferable to tax swaps consistently with long-term debt. For example, consider two persons, the first of whom borrows $100 million at ten percent, and the second of whom borrows $100 million at LIBOR and enters into a swap with respect to which she pays ten percent and receives LIBOR on a notional principal amount of $100 million. Given that the two persons have entered into economically similar arrangements, in general they should be taxed similarly. The need to tax the two parties similarly implies that the correct way to tax the swap is to simply account for the payments under the swap as they are paid (or accrued).

Even, however, where a swap is paired with a borrowing, there is a difference between the fixed-rate borrowing and the variable-rate borrowing plus a swap. In the case of the fixed-rate borrowing, a borrower who wishes to take advantage of a decrease in interest rates to recognize a loss on the borrowing must go through the cumbersome and expensive process of refinancing her debt. On the other hand, in the case of the variable-rate borrowing plus a swap, the borrower need only close out the swap and enter into a new one. In other words, the existence of the swap market greatly enhances the timing option available to long-term borrowers. 322

Putting aside the timing option, there remains a critical difference between a fixed-for-floating interest rate swap and a fixed-rate debt instrument. Accepting that fixed-rate debt is taxed incorrectly, most people would agree that the discrepancy is not sufficiently serious or subject to abuse to warrant fixing. 323 As with many examples of mismeasurement in the income tax, complacency turns to concern when the taxpayer

321. On the other hand, a treatment of swaps that is consistent with the treatment of long-term debt is inconsistent with the treatment of a series of properly priced independent forward contracts. Because each forward contract would generally be off-market, each would involve an up-front payment, the sum of which would be zero. Regardless of whether interest was imputed to each off-market contract, the amount of gain or loss recognized on each individual contract as it matured would be different than the gain or loss recognized for a swap under the treatment of Prop. Treas. Reg. § 1.446-3, 56 Fed. Reg. 31350, 31351 (1991) (treating parties to a swap as having taxable income or loss in each period equal to the amount they pay or receive in payment). Therefore, consistency alone cannot be the determinative factor.

322. The enhanced timing option may be reduced somewhat by the rule that makes both parties to a swap recognize income at the time of an assignment. See id.; § 1.446-3(e)(6), 56 Fed. Reg. 31350, 31353 (1991); see also supra text accompanying notes 155-61 (discussing the effect of the notional principal contract regulations on the timing option); supra note 223 (explaining the value of the timing option where both parties face the same marginal rate, but one party is indifferent to the occurrence of a realization event).

323. See, e.g., Kayle, supra note 311, at 314-15 (arguing that administrative advantages of single rate convention outweigh mismeasurement of income).
leverages her investment in the mistaxed item. Thus, for example, market discount is generally not taxed currently, but there are special rules governing leveraged investments in market discount bonds. Similarly, in certain circumstances, leveraged investments in long-term fixed-rate bonds cause concern. Another example of the concern with leveraged investments is the case of real estate mortgage investment conduits ("REMIC"). A REMIC is a tax-created vehicle for investments in real estate mortgages. In general, the assets of a REMIC consist of a pool of mortgages and the interests in a REMIC consist of debt and a residual ownership interest. Economically, the residual interest can be viewed as owning a highly leveraged investment in mortgages. In other words, a REMIC can be used as a convenient device for a leveraged investment in certain long-term fixed-rate debt. If long-term debt were taxed correctly, this would present no problem. Since, however, long-term debt is taxed incorrectly, the taxable income of the residual interest can be significantly different from its economic income. As a result of this disparity between taxable and economic income, the tax law has developed an elaborate set of special rules for taxing residual interests and has effectively mandated that a broad class of leveraged investments in mortgages must be carried out in the REMIC form.

324. See supra note 81 (listing a variety of Code sections limiting leveraged transactions); cf. Daniel N. Shaviro, Selective Limitations on Tax Benefits, 56 U. CHI. L. REV. 1189, 1214-18 (1989) (arguing that leveraged transactions are inherently abusive).

325. Compare I.R.C. § 1276 (1988) (providing that gain on the disposition of a market discount bond will be treated as ordinary income to the extent of the accrued market discount) with id. § 1277 (providing that the net direct interest expense incurred on debt to purchase or carry market discount bonds shall be deductible in the current taxable year only to the extent it exceeds the market discount allocable to the current taxable year).


327. See I.R.C. § 860D (1988) (defining a REMIC). The debt-like interest in a REMIC is called a "regular interest" and the residual ownership interest is called a "residual interest." Id. § 860G(a)(1)-(2).

328. See Kayle, supra note 311, at 348 (stating that "the income of the residual holder is calculated as if it owned the REMIC's assets and the regular interests in the REMIC represented its debt").

329. Assuming an upward sloping yield curve, the taxable income of the residual holder will generally exceed economic income in the early years of the REMIC and will be less than economic income in the later years. The disparity between economic and taxable income is often referred to as phantom income. See, e.g., Peaslee & Nirenberg, supra note 326, at 175-81 (explaining the source of phantom income).

330. See I.R.C. § 860E (1988) (regulating taxation of excess inclusions); id. § 7701(i) (providing that multi-class mortgage pools not qualifying for REMIC status are to be taxed as corporations). The problem of excess inclusions is usually thought to be one of tranching debt, that is dividing long-term debt into short-term, medium-term, and long-term debt. Tranching debt simply involves taking a blended rate and substituting the correct market rates for the various terms that make up the blended rate. See Kayle, supra note 311, at 342 (discussing how collateralized mortgage obligations (CMOs)
The danger that REMICs pose to the tax system is that they simplify the process of creating leveraged investments in long-term debt. Nevertheless, with a REMIC both the long-term debt (the mortgages) and the leverage supporting the long-term debt (the regular interests), really exist. Interest rate swaps go a step further. An interest rate swap, in essence, creates a fully leveraged investment in long-term debt without having to actually create either the long-term debt or the leverage. Consider, for example, a taxpayer who wishes to purchase $100 million worth of fixed-rate debt, borrowing $100 million at a floating interest rate in order to make the purchase. The cash flow from such a transaction is identical to the cash flow from an interest rate swap under which the taxpayer receives a fixed rate of interest and pays a floating rate of interest. The difference is that the back-to-back loans require actual loans, while the swap requires merely a notional principal amount. As a practical matter, it is vastly easier to enter into the swap than it would be to enter into the back-to-back loans.331

Interest rate swaps thus make it very easy to take advantage of the incorrect taxation of debt. As a result, it is not safe to conclude that because the tax system has always lived with the mistaxation of long-term debt, it should ignore the mistaxation of interest rate swaps. This does not mean that every interest rate swap should be taxed “correctly” according to an expected value approach. It is, however, important to be aware of the extent to which the taxation of swaps varies from their correct taxation and to be prepared to prevent abuses based on that variance.332

331. One reason that the swap is easier to enter into than the back-to-back loans is that the swap subjects the parties to less credit risk. While a swap entails credit risk to the extent that either party may be obligated to make net interest payments, the back-to-back loan potentially entails risk of the principal and the gross interest payments. Also, the transaction costs of the swap are likely to be lower.

332. To some extent, the regulations provide rules designed to limit such abuses. In particular, Prop. Treas. Reg. § 1.446-3(e)(4)(ii), 56 Fed. Reg. 31350, 31359 (1991), provides that if a taxpayer hedges a notional principal contract, the “Commissioner may require that amounts paid to or received by the taxpayer under the notional principal contract be treated in a manner that is consistent with the economic substance of the transaction as a whole.” Also, Prop. Treas. Reg. § 1.446-3(f), 56 Fed. Reg. 31350, 31361 (1991), provides that if (1) a taxpayer enters into a transaction that is not a customary commercial transaction, (2) the general rules would produce a material distortion of income; and (3) the taxpayer would not have entered into the transaction but for that material distortion, then the Commissioner may exercise his discretion to depart from the general rules as necessary to clearly reflect the income from the transaction.
D. Interest Rate Caps

1. Description of an Interest Rate Cap.—An interest rate cap is an agreement to make periodic payments equal to a specified principal amount times the excess, if any, of the level of an interest rate index over a specified rate. In exchange for the promise to pay such excess interest costs, the purchaser of a cap is generally required to make an initial payment. The initial payment is referred to as a cap premium. Thus, for example, the purchaser of an annual-pay five-year LIBOR cap at ten percent with a notional principal amount of $1 million would have the right to receive the excess, if any, of LIBOR over ten percent times $1 million once per year for the next five years. Assume that at the end of the first year, LIBOR was nine percent; at the end of the second year, LIBOR was twelve percent; and at the end of the following three years, LIBOR was 9.5 percent. Under the agreement, the purchaser would receive nothing in the first year, $20,000 in the second year, and nothing for the remaining three years.

2. The Economics of an Interest Rate Cap.—An interest rate cap is the equivalent of a series of cash-settlement options on fixed-rate loans. The cap premium is the sum of the option premiums for each option in the series. To see that the amount payable under a cap agreement is equal to the amount payable under a series of cash-settlement options, consider an option to borrow $1 million for one year at ten percent. If at maturity interest rates are less than ten percent, the option would expire worthless. If the option were settled in cash, no payment would be made. On the other hand, if interest rates are greater than ten percent, the option would be exercised. If the option were settled in cash, a payment would be made in an amount equal to the excess of the cost of the loan over the cost of a ten percent loan. That payment would be equal to the principal of the loan times the excess of the market interest rate over the option rate. Assume that the market rate was twelve percent. In that case,
the payment would be $20,000, exactly the payment under the cap agreement described above. 339

3. Proposed Taxation.—A straightforward application of the rules developed above suggests that for purposes of determining the timing of taxable income a cap should be divided into the individual options of which it is constructed. In order to do this, the cap premium must be allocated among the options in proportion to their fair market value. Each individual option should then be taxed as follows:

(1) No gain or loss should be recognized upon receipt of the premium;
(2) The holder of the cap should accrue income over the life of the option equal to the increase in the expected value of the option;
(3) The holder’s adjusted basis in each option should be equal to her share of the initial premium plus any accrued income; and
(4) The holder of the cap should have income (or loss) at the time of exercise of each option equal to the amount of the payment under the cap minus her adjusted basis with respect to that option.

4. Example 14.—Diva enters into a two-year interest rate cap agreement with David. Under the terms of the agreement, David will pay Diva the excess, if any, of prime over eleven percent times a notional principal amount of $5,000 at the end of each year for two years. Diva pays a premium of $128.10. At the end of the first year prime is ten percent, and, accordingly, David makes no payment. As of the end of the second year prime is fourteen percent, and David makes a payment of $150. 340

For federal income tax purposes, the cap should be divided into two components, a cash-settlement option for the first period and a cash-settlement option for the second period. To properly measure gain or loss on each option, the premium of $128.10 must be divided between the two options. Assume that the fair market value of the individual options is $45.45 and $82.64 for the first and second option, respectively. 341

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338. $20,000 is the principal amount times the difference in the market interest rate and the cap rate.
339. See supra text accompanying note 334.
340. $150 is the notional principal amount times the difference in the prime rate and the cap rate.
341. Options are typically valued using variants of the Black-Scholes option pricing formula. See
Accordingly, Diva is treated as if she purchased two separate options, a one-year option for $45.45 and a two-year option for $82.64.

The one-year option is expected to be worth approximately $50 at the end of the first year.\footnote{This assumes that the value of the option is expected to grow at 10\%. See infra Appendix A.} Accordingly, Diva should accrue income of $4.55 during the first year with respect to the first option. As of the end of the first year, the first option expires worthless and Diva has a loss of $50.\footnote{Her initial basis of $45.45 plus her accrued income of $4.55.}

The two-year option is expected to be worth $90.91 and $100 at the end of the first and second years, respectively. Accordingly, Diva will accrue income of $8.26 in the first year\footnote{\$8.26 = \$90.91 - \$82.64.} and $9.09 in the second year.\footnote{\$9.09 = \$100.00 - \$90.91.} Diva's basis in the second option at the end of the second year will, therefore, be $100. Upon receipt of the $150 option payment, Diva will, therefore, have income of only $50.

Table 3: Taxation of Diva for Interest Rate Cap

<table>
<thead>
<tr>
<th>End of Year</th>
<th>1st Option Income</th>
<th>1st Option Basis</th>
<th>2nd Option Income</th>
<th>2nd Option Basis</th>
<th>Net Income Before Cap Receipt</th>
<th>Cap Receipt</th>
<th>Net Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$4.55</td>
<td>$(50.00)</td>
<td>$8.26</td>
<td>$</td>
<td>$(37.19)</td>
<td>$0.00</td>
<td>$(37.19)</td>
</tr>
<tr>
<td>2</td>
<td>9.09</td>
<td>(100.00)</td>
<td>(90.91)</td>
<td>150.00</td>
<td>59.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$4.55</td>
<td>$(50.00)</td>
<td>$17.35</td>
<td>$(100.00)</td>
<td>$(128.10)</td>
<td>$150.00</td>
<td>$21.90</td>
</tr>
</tbody>
</table>

Table 3 shows the income flows under the analysis presented above. Columns 2 through 5 show the accrual of expected income and the write-off of basis in each year for each of the separate imbedded options. Column 6 contains the sum of columns 2 through 5. Column 7 shows the payment received under the cap, and column 8 gives the total net income for each year.

In lieu of imputing income to each unexpired option and then permitting an increased basis write-off, the same amount of net income could be produced by treating the holder of the cap as being taxable on any payments received under the cap (here $0 and $150) and permitting the...
holder to amortize the cap premium according to a prescribed schedule. The appropriate amortization for the cap in Example 14 can be seen in column 6 of Table 3. Under the approach described above, in the first year Diva has income of $4.55 and $8.26 from the first and second options and a basis write-off of $50 from the first option. Her net deduction before cap receipts is, therefore, $37.19. In the second year she has a net deduction before cap receipts of $90.91. Together, these amounts equal her premium of $128.10.346 Thus, alternatively, she could simply be permitted to amortize $37.19 of her basis in the first year and $90.91 in the second year.

While the amortization approach works in Example 14, it does not work in all cases. In particular, the amortization approach fails when the amount of income accruing with respect to options for later years exceeds the amount of premium allocable to the options maturing in the early years.347 Nevertheless, such an amortization approach may be a reasonable compromise solution.

Note also that the suggested amortization method differs from the amortization that would be permitted simply by reference to the amount paid for each option ($45.45 for the first option and $82.64 for the second option). The difference between these two approaches can be explained by the fact that the latter approach fails to take into account the increase in value in the second option during the first year.348

346. These computations ignore the timing differences between amounts accrued during the year and write-offs at the end of the year.

347. Consider a simple example in which the option premium with respect to the first year is $10 and the option premiums with respect to the second and succeeding years total $200. Assume that interest rates remain below the cap rate at all times, so there are no further payments under the cap. In the first year, the purchaser of the cap should have income of approximately $1 from the first option and $20 from the later options (assuming a 10% growth rate) and a write-off of $11 from the expiration of the first option. The purchaser’s net income for the first period is $10 ($10 = $1 + $20 - $11). Under an amortization approach, the closest approximation would be to permit zero amortization, giving the purchaser of the cap net income of zero. Any additional amortization would simply permit the purchaser to take a loss where, in fact, he had net income. Thus, under these circumstances, there is no amortization schedule that will correctly match the income flow from the cap contract.

348. The court in Citizens & S. Corp. v. Commissioner, 91 T.C. 463 (1988), aff’d per curiam, 919 F.2d 1492 (11th Cir. 1990), made essentially the same mistake in determining the amortization of core deposits. See id. at 473 (permitting an amortization deduction for core deposits equal to the present value on the acquisition date of the expected cost savings for the taxable year without regard to changes in value of cost savings in other taxable years); see also George Mundstock, Eleventh Circuit Affirms Accelerated Depreciation of Land?, 47 TAX NOTES 737, 738 (May 7, 1990) (arguing that “the Tax Court’s approach ignores the increase in value of future cost savings and therefore radically exceeds economic depreciation”). The amortization method proposed in the text is different than the amortization method prescribed in the proposed regulation. See Prop. Treas. Reg. § 1.446-3(e)(2)(ii).
5. **Treatment Under Current Law.**—Proposed Treasury Regulation section 1.446-3(e) provides rules for taxing both the periodic payments made under an interest rate cap and the cap premium. Under the regulations, periodic payments are taken into account over the period to which they relate. In general, nonperiodic payments, such as a cap premium, must be recognized over the term of the contract "in a manner that reflects the economic substance of the contract." In the case of a cap, the cap is considered to be equivalent to a series of cash-settled option contracts. Accordingly, the premium must first be allocated among the individual options. The portion of the premium allocated to each separate option is then recognized during the period in which that option expires. The difference between the approach taken in the proposed regulations and expected value taxation is that the regulations fail to take into account the expected increase in value of each option as it matures.

### E. Hybrid Debt Instruments

#### 1. Description of a Hybrid Debt Instrument.

The term "hybrid debt instrument" is used in this Article to refer to a combination of a conventional debt instrument and one or more other derivative products, such as forwards or options.

#### 2. Proposed Taxation.

For purposes of determining the correct timing of income, a hybrid debt instrument should first be divided into the noncontingent debt instrument and the various derivative products of which

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353. Id. The regulations deal with the administrative problem of valuing the separate options in two ways. First, the regulations provide that the option pricing used by the parties to determine the total amount paid for the cap or floor will be respected, if reasonable. Id. Second, the regulations provide that the Commissioner may publish a revenue procedure providing an alternative method for valuing the options. Id. § 1.446-3(e)(3)(ii)(D)(2), 56 Fed. Reg. 31350, 31357 (1991). The Treasury published a sample revenue procedure in the preamble to the regulations. Under the sample revenue procedure, the cap premium would be allocated based on the term of the interest rate cap and the excess of the cap rate over the current interest rate. See Regulations Under Section 446 of the Internal Revenue Code of 1986: Application of Section 446 with Respect to Notional Principal Contracts, 56 Fed. Reg. 31350, 31352-53 (1991). Presumably the allocations provided in the revenue procedure would be based on the Black-Scholes option valuation formula and Service estimates of interest rate variance. See Appendix A for more information on the Black-Scholes formula.
354. Traditionally, the term "hybrid securities" has been used to refer to securities that combine features of debt and equity. See, e.g., HARRY G. HENN & JOHN R. ALEXANDER, LAWS OF CORPORATIONS § 162 (3d ed. 1983) (defining hybrid securities as combinations of debt securities and shares).
it is composed. Second, the issue price of the entire instrument should be
allocated among the pieces in proportion to their respective fair market
values. Income should then be accrued in the usual fashion with respect
to both the debt instrument and each of the derivative products. Gain or
loss should be recognized with respect to each derivative product
whenever its value is determined.

The proposed approach is close to the approach that has been
adopted by the Treasury Department in the recent modification to the
proposed original issue discount rules (the "Paragraph (g)" rules).355
There are, however, at least a couple of differences. First, having
bifurcated the issue price of the hybrid debt instrument into an issue price
for a noncontingent debt instrument and a price for one or more derivative
products, the Treasury fails to take the next step of accruing income on the
issue price of the derivative products, thereby providing anticipated deferral
with respect to the instrument as a whole.356

Second, the Treasury has limited the application of the Paragraph
(g) rules to debt instruments that: (1) provide for noncontingent payments
equal to or greater than the issue price; and (2) provide for one or more
contingent payments determined, in whole or in part, by reference to the
value of publicly traded stock, securities, commodities, or other publicly
traded property.357

3. Example 15.—Consider a ten-year debt instrument that
provides for ten percent interest on a $1000 face amount, but,
in lieu of the payment of $1000 at maturity, the holder will be
paid five times the price of an ounce of gold. Assume further
that the ten-year forward price for gold is $200,358 and that
the instrument is issued at par. Finally, assume that at matur­
ity, the price of gold is $110 per ounce.

The instrument is a combination of a ten-year, ten percent debt
instrument with a $1000 face value issued at par and a single ten-year
prepaid forward contract. Assuming the holder purchased the debt at
issuance, the holder should be taxable on the ten percent coupon on an

panying note 95.
357. Id. The Commissioner is permitted to apply the new rules to a debt instrument that otherwise
meets the requirements of Paragraph (g)(l) even when the issue price of the instrument exceeds the total
noncontingent payments by an insubstantial amount. Id. § 1.1275-4(f)(l), 56 Fed. Reg. 8308, 8310
(1991). The application of the Paragraph (g) rules is also limited to debt instruments issued for cash
358. This example assumes that there is a ten-year forward market. The informational problems
in this approach are discussed more fully below. See discussion infra Part VIII.
annual basis. At maturity, the holder should have a basis of $1000 in the instrument. Upon payment of the $550 redemption price, the holder should have a loss of $450.\textsuperscript{359} The issuer’s tax treatment should mirror the holder’s.

The taxation of hybrid debt instruments under current law depends on whether they come under the Paragraph (e) or Paragraph (g) rules.\textsuperscript{360} Under the Paragraph (e) rules, the instrument would be divided into its contingent and noncontingent components, and the entire issue price would be allocated to the noncontingent payments.\textsuperscript{361} The noncontingent components, consisting of the interest coupons, would then be analyzed under the general OID rules.\textsuperscript{362} Under those rules, the noncontingent debt instrument would have both an issue price and a stated redemption price at maturity of $1000.\textsuperscript{363} Accordingly, it would have no OID and there would be no accrual of income under the noncontingent instrument. The effect of this result is to treat all coupon payments as nontaxable returns of principal. Upon maturity, any payment made based on the price of gold would be treated as contingent interest.\textsuperscript{364} The holder, therefore, would have no income until the end of the tenth year, at which time he would have income of $550.

Under the Paragraph (g) rules, the issue price would be allocated between the contingent and noncontingent payments in proportion to their respective fair market values.\textsuperscript{365} The noncontingent payments consist of

\textsuperscript{359} The example was chosen so that the issue price would equal the expected redemption price valued at the forward price. If, for example, the forward price of gold was only $100, the instrument would have been treated as if it had a stated redemption price at maturity of, only $500 and was, therefore, issued at a premium. In that case it would have had a yield to maturity of approximately 6.25%, and each payment of $100 in stated interest would be treated as partially interest and partially a return of principal. Any difference between the “expected” payment of $500 and the actual payment would be treated as gain or loss at the time of payment.

\textsuperscript{360} See supra text accompanying note 95. As described, the instrument would come under the Paragraph (g) rules. The analysis is presented under both sets of rules for purposes of comparison. If the instrument in the example had a coupon rate under 10% or a term under 10 years, the amount of the noncontingent payments would be less than the issue price and the Paragraph (f) rules would apply. Prop. Treas. Reg. § 1.1275-4(g)(1), 56 Fed. Reg. 8308, 8310 (1991). But see id. § 1.1275-4(f)(1), 56 Fed. Reg. 8308, 8310 (1991) (stating that the Commissioner can apply Paragraph (g) if the difference between the noncontingent payments and the issue price is insubstantial). In either case, the discussion assumes that the instrument would be treated as debt. The original issue discount rules apply only to debt obligations and do not seek to define the term. Id. § 1.1275-4(a)(1), 56 Fed. Reg. 8308, 8310 (1991).

\textsuperscript{361} See supra text accompanying notes 98-100.

\textsuperscript{362} Id.

\textsuperscript{363} The issue price would be the issue price of the entire instrument which is by hypothesis $1000. Prop. Treas. Reg. § 1.1275-4(e)(1), 51 Fed. Reg. 12022, 12090-91 (1986). The stated redemption price at maturity would be the sum of all of the payments under the noncontingent instrument which would be the ten interest coupons of $100 each.


\textsuperscript{365} Id. § 1.1275-4(g), 56 Fed. Reg. 8308, 8310-11 (1991).
ten annual payments of $100. The fair market value of such a stream of payments is approximately $614.\textsuperscript{366} The fair market value of the right to receive five times the price of gold in ten years is equal to the present value of five times the forward price of gold, or $386. The instrument would therefore be bifurcated into an installment obligation with an issue price of $614 and a prepaid forward contract with an issue price of $386. Income would accrue with respect to the installment obligation under the normal constant-yield OID rules.\textsuperscript{367} No income would accrue with respect to the forward obligation.\textsuperscript{368} At maturity, the holder would have additional income of $164.\textsuperscript{369}

Table 4 shows the income that would be accrued under each of the three methodologies discussed above. Column 2 shows the accrual of income under the expected value approach. Columns 3 and 4 show the accrual of income under the Paragraph (e) rules. As discussed above, no income would accrue with respect to the noncontingent bond because it would have an issue price of $1000, equal to its stated redemption price at maturity, and, therefore, be treated as having no original issue discount. All of the income on the bond would be treated as accruing on the contingent portion, and that income would accrue only at maturity when it became noncontingent. Columns 5 and 6 show the income that would accrue under the Paragraph (g) rules. As discussed above, the noncontingent portion would be treated as having an issue price of only $614 and would therefore accrue $386 of original issue discount over its life. The contingent portion would accrue no income until maturity and would then have income of $614 (the $1000 payment minus the issue price of $386). As can be seen by inspection, the Paragraph (g) rules are much closer to the expected value rules than are the Paragraph (e) rules, but still provide for substantial expected deferral of income.

\textsuperscript{366} The noncontingent payments are equivalent to a ten-year annuity or installment obligation. The present value of such a stream of payments assuming a 10% discount rate is $614.
\textsuperscript{369} $164 is the difference between the payment received under the forward contract and the amount allocated for its purchase.
Table 4: Hybrid Instrument Income Accrual

<table>
<thead>
<tr>
<th>Year</th>
<th>Expected Value</th>
<th>Paragraph (e) Non-contingent</th>
<th>Paragraph (e) Contingent</th>
<th>Paragraph (g) Non-contingent</th>
<th>Paragraph (g) Contingent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$100</td>
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<td>$0</td>
<td>$61</td>
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<td>2</td>
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<td>Maturity</td>
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<td>0</td>
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<td>0</td>
<td>164</td>
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</table>

VIII. Information Requirements

The expected value approach to taxing financial instruments requires two sets of information: (1) the fair market value of each component of the instrument;\(^{370}\) and (2) the expected future value of each component, both measured at the time the transaction is entered into.

The fair market value of each component is required in order to allocate the cost of the instrument among the various components.\(^{371}\) Obviously, the task of determining the fair market value can in some

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\(^{370}\) When there is only a single component such as a single option or forward contract, there is no need to separately determine the fair market value of any components. It may still be necessary to determine the overall fair market value of the instrument when it is exchanged for property. See I.R.C. § 1273(b)(3) (1988) (determining the issue price of debt instruments issued for publicly traded property); id. § 1274(b)(3)(A) (setting the issue price for debt instruments issued for other types of property).

\(^{371}\) Allocating too much of the issue price to short-term components of the instruments will cause income to be deferred. Correspondingly, allocating too much of the issue price to long-term components will cause income to be accelerated. See supra text accompanying notes 308-09 (describing the problems of misallocation).
instances be quite difficult. Nevertheless, it is generally feasible, particularly if taxpayers are given reasonable latitude in estimating fair market value. Moreover, it is a task that is already deeply imbedded in the tax law. Any time that a taxpayer purchases a bundle of assets for a single price, it is necessary, at least in theory, to separately allocate the cost of the acquisition among the assets purchased. For example, in

372. It is of some help in allocating payments that, in general, the two sides of a financial transaction will have adverse interests. The holder of the instrument will ordinarily prefer to allocate as much as possible of the issue price to the short-term components of the instrument so as to maximize the portion of the early returns to the instrument that are characterized as return of capital as opposed to interest. Correspondingly, the issuer will ordinarily prefer to minimize the allocation of the issue price to the short-term components so as to front-load income. Of course, this analysis assumes that both sides of the financial transaction are taxable at the same rate. If one of them is nontaxable, the assumption of adverse interests no longer holds. See supra text accompanying note 193. Moreover, even if they are both taxable, but at different rates, they can both be made better off by misallocating the issue price and adjusting the total issue price to compensate the loser for the misallocation.

The proposed notional principal contract regulations provide an example of the latitude that can be given to the parties to a financial contract. Under the regulations, the parties to an interest rate cap are required to allocate the cap premium over the term of the cap agreement. The regulations provide that “the option pricing used by the parties to determine the total amount paid for the cap or floor will be respected, if reasonable.” Prop. Treas. Reg. § 1.446-3(e)(3)(ii)(C), 56 Fed. Reg. 31350, 31357 (1991). On the other hand, the proposed regulations also demonstrate the weakness of the assumption that the parties have adverse interests. If one of the parties is a dealer electing mark-to-market treatment under § 1.446-4, the allocation will have no effect on its tax liability and, therefore, neither party will have an incentive to correctly allocate the cap premium. Id. § 1.446-4, 56 Fed. Reg. 31361 (1991).

A second example of regulations providing latitude to parties in the allocation of purchase price is the investment unit rules under I.R.C. § 1273 (1988). Under those rules, if neither the debt instrument nor the property right making up an investment unit are publicly traded, the issue price of the debt instrument is determined by discounting the payments under the instrument at a rate agreed to by the parties. The rate must be based on yields of other recent debt instruments issued by the same issuer or of comparable debt instruments of other issuers. Prop. Treas. Reg. § 1.1273-2(d)(2)(iv), 51 Fed. Reg. 12022, 12062 (1986).

373. See, e.g., I.R.C. § 338 (1988) (providing that a corporate purchaser of the stock of a target corporation is permitted to elect to treat the target as a new corporation that purchased all of the assets of the target corporation and must then allocate the purchase price among all of the assets of the target); id. § 1060(a) (requiring that a purchaser of a trade or business allocate basis among the assets purchased); id. § 1273(c)(2)(B) (requiring that the issue price of an investment unit must be allocated to each element of the unit on the basis of the relationship of the fair market value of such element to the fair market value of all elements in the unit); Treas. Reg. § 1.1234-2(d) (as amended in 1980) (stating that the grantor of multiple options is required to allocate the premium received among the options granted on the basis of the relative fair market value of such options at the time of their issuance or on any other reasonable and consistently applied basis that is acceptable to the Commissioner); Williams v. McGowan, 152 F.2d 570, 572 (2d Cir. 1945) (holding that the seller of a business must allocate the purchase price among the individual assets sold); Rev. Rul. 78-182, 1978-1 C.B. 265 (providing that the writer of a put and call for a single premium must allocate the premium between the put and call).

In fact, even when a taxpayer purchases what appears to be a single asset, the taxpayer may have to allocate the purchase price to different parts of the asset. For example, if a taxpayer purchases a plot of land and later sells part of the land, the purchase price must be allocated between the part sold and the part retained, based on their respective fair market values at the time of purchase. Treas. Reg.
the case of a purchase of a business, the purchaser must allocate the purchase price among the assets, both tangible and intangible, of the business being acquired. As a result, allocating a total price among the various components of a purchase is familiar to taxpayers, the Service, and the courts.

More specifically, in the context of financial instruments, taxpayers are required to allocate the issue price of an investment unit among the parts of the unit. The recent proposed changes to the original issue discount rules extend this treatment to certain financial instruments where the different elements are imbedded in a single instrument. The expected value approach merely extends this rule more generally to financial instruments.

Finally, it is important to note that precision is not required in allocating the issue price any more than precision is required in the myriad other circumstances in which it is theoretically necessary to know the fair market value of some item or to allocate a total price by fair market value.

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374. See I.R.C. § 1060(a) (1988); supra note 373.
375. See I.R.C. § 1273(c)(2)(B); supra note 373.
377. Allocating the purchase price of a financial instrument among its components assumes, of course, that it is possible to identify the various components. At least two conceptually separate difficulties arise. First, as a practical matter, it may be extremely difficult to identify the separate elements of a financial instrument. For example, consider a covenant to a debt instrument that restricts the corporation's ability to pay dividends if earnings fall below a specified level. In theory, the value of the covenant could be separately identified and accounted for. As a practical matter, it is unlikely to be worthwhile to do so.

Second, as a theoretical matter, in general there will not be a unique way of dividing up a financial instrument into components. Consider, for example, a debt instrument with an imbedded forward. Obviously, the debt instrument could be divided into a pure debt instrument and a forward. On the other hand, a long forward position is equivalent to the purchase of a call option combined with the sale of a put option. Thus, the instrument could be divided up into a debt instrument plus a call plus a put. More generally, there are broad equivalences across different types of financial instruments. For example, as between buying or selling an asset, buying or selling a call on the asset, buying or selling a put on the asset, and borrowing or lending, any one of the four can be created with appropriate combinations of the three others. See, e.g., BREALEY & MYERS, supra note 18, at 488-90. One of the consequences of the expected value approach is that the taxation of the instrument should be as similar as possible however the instrument is constructed or deconstructed.

The flip side of the fact that there are multiple ways to deconstruct an instrument is that there are multiple ways to actually enter into any given economic arrangement. See supra note 189. To the extent that, for example, creating a synthetic call involves continuous trading in the underlying good, absent a mark-to-market system, a synthetic call will inevitably be taxed differently than an actual call option (the synthetic call will be effectively marked to market by virtue of the constant trading and the realization doctrine, while unanticipated gains and losses on the actual call will be deferred). Nevertheless, absent mark-to-market taxation, I believe that expected value taxation provides the best general principle to determine taxation of financial instruments.
In particular, when the expected future value of a component is known or can be estimated, its fair market value can be estimated by discounting the future value back to the present.\(^{378}\)

Once the issue price has been allocated among the various components, it is necessary to determine the expected future value of each such component. In theory, this requirement would necessitate knowing the expected future value at each point in time. Thus, for example, if the instrument has a two-year life, it would be necessary to know, as of the creation of the instrument, the expected value for each day in the two-year period. As a practical matter, however, it would be far simpler and without serious loss in accuracy to simply determine the expected future value at maturity and to assume a constant yield growth. This calculation is precisely how the OID rules work with a zero-coupon bond.\(^{379}\)

As discussed above, the expected future value should be based on an objective market valuation, not on the subjective expectations of the participants to the transactions. Thus, just as the current fair market value of each component should be based on what a willing buyer would pay a willing seller, the expected future value is best measured by what a willing buyer would promise to pay a willing seller in the future. In other words, the best measure of the expected future price is the forward price for the instrument.\(^{380}\)

Unfortunately, in many cases forward markets for the underlying goods will not exist, or will not be sufficiently established to provide reliable prices.\(^{381}\) It may, however, often be possible to estimate a hypothetical forward price, even when no actual forward market exists. In general, in a competitive market in equilibrium, the forward price for a good is equal to the spot price plus the cost of carrying the good.\(^{382}\) Thus, even when there is no forward market, it may be reasonable to


\(^{379}\) See supra text accompanying note 93 (discussing the OID rules).

\(^{380}\) See supra section VII(A)(2).

\(^{381}\) One of the reasons for the development of new financial products is to help bridge the gaps between existing financial markets. For example, the maximum term of LIBOR futures on the International Monetary Market at the Chicago Mercantile Exchange is approximately six months. See WALL ST. J., Oct. 17, 1991, at C-16 (reporting LIBOR futures quotes). Interest rate swap contracts, however, routinely extend well beyond this period.

\(^{382}\) See supra note 263.
estimate forward prices by reference to spot prices and an estimated cost of carrying the underlying commodity.\textsuperscript{383}

As compared to a full accrual system, the information requirements for the expected value approach may be either more or less burdensome. Under a full accrual system, valuation of the entire instrument is required as of the end of each accrual period. Under the expected value approach, more information is required initially because each component of the instrument must be separately valued and the expected future values of each such component must be estimated. On the other hand, after the initial valuations, no further valuations are required as the instrument matures.\textsuperscript{384}

Although the information requirements of a full accrual system are the single most persuasive argument against its adoption, full accrual accounting has also been criticized on other grounds, including liquidity problems and the resulting fluctuations in federal tax revenues.\textsuperscript{385} On these grounds, the expected value approach is clearly superior. Regarding liquidity, an investor in a financial instrument taxed under the expected value approach would know the taxation of the instrument prior to her investment, and would presumably be able to plan around any liquidity problems. With respect to fluctuations in federal revenues, revenues under the expected value approach should prove no more volatile than revenues under the existing approach to financial instruments.

IX. Conclusion

The current taxation of financial instruments is unsatisfactory. It has developed as a hodgepodge of often inconsistent rules that frequently fail to tax financial instruments correctly, providing taxpayers with myriad opportunities to manipulate their income and to defer gains. It has long been recognized that the ideal solution would be to mark all such instruments to market on a periodic basis, thereby correctly taxing all parties on their income. For a variety of reasons this solution is likely to be adopted only slowly.

Absent mark-to-market accounting, this Article suggests the need for a uniform framework to be used to develop rules for consistent

\textsuperscript{383} See supra note 263.

\textsuperscript{384} Values are required when a contingency is resolved. Ordinarily, the resolution of a contingency involves a cash payment and valuation should not present a problem. In some cases, when the resolution of the contingency triggers a transfer of property or a future payment, valuation will be an issue. In particular, if, for example, income is to be recognized upon the exercise of an option settled in property, valuation may be an issue.

treatment of such instruments. In particular, the Article suggests that an appropriate set of timing rules would: (1) divide complex financial instruments into individual components consisting of a single contingency; (2) accrue income with respect to each such component based on the expected future value of the component determined as of the time the instrument is created; and (3) tax the parties to the transaction on gain or loss whenever such a contingency is resolved. While in many circumstances the direct application of these proposed rules would be difficult, it is hoped that they will provide a generalized framework against which rules dealing with specific instruments can be tested.
Appendix A: The Amortization of an Option Premium

In the body of the Article I argue that, in general, an option should be taxed as if the value of the option is expected to increase over time. This point is not uniformly accepted in the tax literature. One way to demonstrate that the market expects the value of an option to increase is to consider the forward price for an option. For example, an option that matures in two years and a day is currently selling for $100. Consider a forward contract to purchase the option in two years. Assuming an interest rate of ten percent, the forward price for the option must be $121. This can be proved by a standard arbitrage argument. Assume, first, that the forward price is $120. In that case, I could write an option currently for $100, buy an option forward for $120, and invest the $100 in a two-year zero-coupon bond. At the end of two years, the bond would pay me $121. I would use $120 to purchase the option. I would then be long and short in the same option, which would effectively cancel, and I would have $1 left over. Such arbitrage transactions would be continued until the spot price for the option was bid down and the forward price bid up. Conversely, if the forward price was in excess of $121, the arbitrage function could be similarly performed by borrowing money, buying options in the spot market, and selling options forward.

Thus, the forward price of an option is equal to the spot price plus the carrying cost—primarily the interest cost of carrying the premium. Given that the forward price is in excess of the spot price when the option is purchased, it is anomalous to argue that the holder of the option should be entitled to amortize her purchase price.

The confusion may arise out of the notion of the “time value of an option.” This expression refers to the fact that, all else being equal, the value of an option increases with its term (i.e., the length of time between the purchase and exercise dates). This is true because of the interaction of two factors: (1) the volatility in the price of the underlying asset;
The longer the term of the option, the more opportunity for the price of the underlying asset to reach extreme values. The value of the option, however, is asymmetric around these values. In other words, at the maturity of a call option, if the price of the underlying asset is very high, the option is very valuable, increasing on a dollar-for-dollar basis with the price of the underlying asset. If, however, the price of the underlying asset is very low, the option is already worthless and suffers no decline in value as the value of the asset drops. As a result, at any given point in time the value of a long-term option is greater than the value of an otherwise identical option with a shorter term. Consequently, it is possible to draw the erroneous inference that the value of the long-term option is expected to decline over time. As the arbitrage argument above demonstrates, this conclusion is not accurate.

Another way to approach the same question is to look at the basic valuation formula for an option, the Black-Scholes option pricing formula:

\[
V = \frac{1}{(1+r)^t} \left[ P \times N(x) - S \times N(x - \sigma \sqrt{t}) \right]
\]

where:

\[
x = \frac{\log(P/S)}{\sigma \sqrt{t}} + \frac{1}{2} \sigma \sqrt{t}
\]

\(P\) = the forward price of the good, \(S\) = the strike price, \(r\) = the discount rate, \(\sigma\) = the standard deviation of price changes, \(N(x)\) = the cumulative normal distribution function, \(s\) = time between payment and exercise, and \(t\) = time between entering into contract and exercise. Notice that time enters into the valuation equation in two ways. First, as \(s\), time appears in the term, \(1/(1+r)^s\) (the “discount term”), and second, as \(t\), time appears in the remaining term (the “value term”). The value term provides an estimate of the value of the option at maturity, while the discount term adjusts the value back to the time of payment.

390. Id. at 638-39.
391. Id. at 638. While this statement is generally true, it is not always true. To see this result, consider a commodity whose price is fixed at $100. Consider two options, one to purchase the commodity for $90 in one year and the other to purchase the commodity for $90 in two years. The value of the two-year option would simply be the present value of $10, the difference between the option price, $100, and the strike price, $90. Assuming a 10% discount rate, the two-year option should be worth approximately $8.26 ($8.26 = ($100 - $90)/(1.1)^2). Similarly, the value of the one-year option would be $10, discounted by only one year, or approximately $9.09. Thus, when there is no price volatility, the value of a short-term option exceeds the value of a long-term option. Id. at 638-39.
392. The Black-Scholes formula originally appeared in Black & Scholes, supra note 389.
393. The value of an option at any time is equal to its discounted expected future value in a risk-
Consider now a contract to purchase the option at some point in the future. Assuming that prices for the future purchase are set at time zero, the value term will be unchanged. In other words, it will still be based on current values of \( P, S, \sigma, \) and \( t \). The discount term, however, is a function of the time between payment and maturity of the option. Therefore, the later that payment is made, the smaller \( s \) and the greater the discount term and, correspondingly, the value of the option.

neutral world. See Cox & Ross, supra note 277. A possible source of error in working with options is to confuse the expected future value of an option with the future value of the option given the expected future price. Because the value of an option is a nonlinear function of price, these two numbers are not the same. See Black & Scholes, supra note 389, at 638-39. For example, consider a good that can have three possible prices, $7, $10, and $13, each with equal probability. The expected future price of the good is $10, the average of the three prices. Consider, however, an option to purchase the good at $10. If the future price is the expected price of $10, the option will be worthless. The expected future value of the option, however, is not zero. If the price is $13, the option will be worth $3, while if the price is $10 or $7, the option will be worthless. Therefore, the expected value of the option is $1. Cf. New York State Bar Ass'n, supra note 279 (discussing a "static" mark-to-market approach); Kleinbard, supra note 196, at 950-52 (analogizing caps to options in that both share in the up-side but not the down-side risks).
Appendix B: Forward Interest Rates

To prevent the possibility of arbitrage, forward interest rates must bear a specific relationship to the term structure of interest rates. In other words, given any particular term structure of interest rates, there is only one set of forward rates that is consistent with that term structure.\(^3\) To see this relationship, define \(r_{i,j}\) as the zero-coupon interest rate which applies at the present time to a borrowing from time \(i\) until time \(j\). For example, \(r_{0,1}\) and \(r_{0,2}\) are the current (time=0) interest rates for a one-period and a two-period borrowing, respectively. Similarly, \(r_{1,2}\) is the current interest rate available for borrowing from time \(1\) until time \(2\). In other words, \(r_{1,2}\) is the forward interest rate for a one-period borrowing starting one period in the future. The assertion that the term structure of interest rates implies a set of forward interest rates is equivalent to the assertion that given \(\{r_{0,1}, r_{0,2}, \ldots, r_{0,n}, \ldots\}\), it is possible to determine all remaining interest rates, \(r_{i,j}\).

The formula for the equilibrium forward rate from period \(i\) to period \(j\) \((j>i)\) is:\(^5\)

\[
r_{i,j} = \left[ \frac{(1 + r_{0,j})^j}{(1 + r_{0,i})^i} \right]^{\frac{1}{j-i}} - 1.
\]

Thus, for example, if the one-period spot rate, \(r_{0,1}\), is 6.0\% and the two-period spot rate, \(r_{0,2}\), is 6.5\%, the forward rate for a one-period borrowing beginning in one period is 7.0\%:

\[
7.00\% = \frac{1.065^2}{1.06} - 1.
\]

To see that 7.0\% must be the current forward rate, consider what would happen if the forward rate was in excess of 7.0\%. For example, assume the forward rate is 8.0\%. It would then be possible to conduct the following arbitrage operation. First, borrow $94.34 for two periods (Loan #1). At the spot two-period rate of 6.5\%, you will be obligated to repay $107 in two years. Second, lend $94.34 for one period at the spot one-period rate of 6.0\%, receiving back $100 at the end of the first period (Loan #2). Finally, enter into a forward contract to lend $100 between

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394. See BREALEY & MYERS, supra note 18, at 570 (showing that forward rates are "implicit" in the term structure); SARKIS J. KHOURY, SPECULATIVE MARKETS 217-21 (1984) (showing the relationship between forward rates and the term structure).

periods one and two at the forward rate of 8.0% (Loan #3). Your net cash flows from this transaction will be as follows (in dollars):

<table>
<thead>
<tr>
<th>Time</th>
<th>Loan 1</th>
<th>Loan 2</th>
<th>Loan 3</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$94.34</td>
<td>(94.34)</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>--</td>
<td>$100.00</td>
<td>(100.00)</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>(107.00)</td>
<td>--</td>
<td>$108.00</td>
<td>1</td>
</tr>
</tbody>
</table>

In other words, you will have a guaranteed income of $1 at the end of two periods. Similarly, if the forward rate is less than the equilibrium rate of 7.0%, you can make a certain arbitrage profit by lending for two periods at the two-period rate and borrowing at the spot rate and the forward rate. Similar arbitrage arguments can be used to prove the general equation for forward rates given above.
Appendix C: Further Comments on the Treatment of Uncertainty Under the OID Rules.

As noted in the body of the Article, the original issue discount rules generally ignore contingent payments until they become fixed. Once a contingent payment is fixed it is generally immediately taken into taxable income.\(^{396}\) If, however, such a fixed payment is not due for at least six months, the present value of the now-fixed contingent interest is taken into income and additional interest income is accrued based on the difference between the present value of the payment and the amount of the future payment.\(^{397}\)

In general, the contingent interest rules have the effect of deferring the accrual of expected income.\(^{398}\) When the contingency relates to a future event, however, the accrual of income can be accelerated. Consider again Example 3A.\(^{399}\) In that example, Diva pays David $100 today in exchange for either $100 or $142 in two years, the amount to be determined by an immediate flip of a coin. Assume that David's obligation to Diva is a debt instrument covered by the OID rules. Under the OID rules, the transaction would be bifurcated into a noncontingent debt instrument issued for $100 with a stated redemption price at maturity of $100, and a contingent debt instrument providing for a payment of either zero or $42 at maturity.\(^{400}\) The noncontingent instrument would have a zero yield and, as a result, there would be no income imputed to the holder of the instrument.\(^{401}\)

The treatment of the contingent debt instrument is more complicated. Under the regulations, the parties are treated as if the borrower had issued a separate debt instrument on the date the amount of the payment becomes fixed, maturing on the date that the payment is due.\(^{402}\) The stated principal amount of this separate debt instrument is


\(^{398}\) See supra text accompanying note 109.

\(^{399}\) See supra text accompanying note 28.


\(^{401}\) See supra text accompanying note 108.

the amount of the payment that has become fixed (either zero or $42 in our example). An amount equal to the issue price of the deemed debt instrument is then accounted for as if an amount of interest equal to the issue price had been paid by the borrower to the lender as interest on the date that the amount of the payment became fixed. The issue price of the deemed debt instrument (and, therefore, the amount of interest treated as paid) is determined by discounting the fixed payment at the applicable federal rate determined as of the time of the original debt issuance.

Thus, assume that after paying $100 in exchange for the promise to be paid either $100 or $142 in two years, Diva wins the coin toss and David becomes obligated to pay $142. Under the proposed regulations, Diva would be treated as having immediately received $35 in contingent interest. Furthermore, Diva would be required to accrue an additional $7 of OID over the remaining two-year period. The following table compares the amount that the holder of such a debt instrument would be required to accrue under the contingent interest rules to the amount such a holder would accrue under a full accrual regime:

<table>
<thead>
<tr>
<th>Time of accrual</th>
<th>Income under contingent interest rules</th>
<th>Income under full accrual regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately after the coin toss</td>
<td>$35</td>
<td>$17</td>
</tr>
<tr>
<td>During the first year</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>During the second year</td>
<td>4</td>
<td>13</td>
</tr>
</tbody>
</table>

As can be seen from the above table, in this example the contingent interest rules overaccrue, rather than underaccrue income.

The deferred contingent interest rules do not always overaccrue income. The problem is that the rules require the immediate accrual of all previously contingent interest at the time that the interest becomes fixed, without regard to the period to which such interest relates. In general, to the extent that the newly fixed interest relates to prior periods, the rules

403. Id.
404. Id.
405. Id. § 1.1275-4(e)(3)(ii)(B), 51 Fed. Reg. 12022, 12091 (1986). It is not clear from the text of the regulation what date is used for determining the applicable federal rate. The choice of date is, however, made clear by Example 3 in the rules. See id. § 1.1275-4(e)(4), 51 Fed. Reg. 12022, 12091 (1986) (discounting all payments under the separate debt instrument at the rate in effect on the date the debt instrument was issued).
406. The calculation assumes the applicable federal rate is 10%. 
properly require its accrual. Conversely, to the extent that the newly fixed interest relates to future periods, the rules improperly require its accrual.407

The OID rules have a couple of other features worth noting. While the OID rules do not generally accrue income based on expected amounts of future payments, the rules do require the accrual of income based on the expected time of future payments in at least two circumstances. The first concerns debt instruments subject to puts by the holder or calls by the issuer. Consider first a call on a debt instrument issued at a discount. In light of the existence of the call, it is not known when the instrument will be retired and, therefore, it is not possible to compute a yield or the amount of discount allocable to each period. The regulations solve this problem by assuming that the call will be exercised (or fail to be exercised) at such time so as to minimize the yield paid by the issuer.408 Similarly, in the case of a put by a holder, the regulations assume that the put will be exercised (or fail to be exercised) at such time so as to maximize the yield received by the holder.409 If in fact the call or put is exercised at other than the assumed time, adjustments are made at that time.410

In other words, the regulations take the approach of treating the instrument as if it provided for certain timing of payments, even though the actual timing of payments is uncertain. Conceptually, this is no different from treating contingent payments as if they were fixed and making adjustments when the assumption turns out to be untrue. An even more sophisticated example of the same overall approach can be found in section 1272(a)(6), which deals with the timing of income in the case of debt instruments whose payments may be accelerated by reason of prepayments of other obligations securing such debt instruments.411 For example, consider a pool of thirty-year mortgages that serve as collateral for debt that is issued at a discount. The debt has a nominal term of thirty years, but is prepayable as the individual mortgages are prepaid. Under section

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407. To see this distinction, compare the following two debt instruments, both with ten-year terms and no noncontingent interest. Assume that the first instrument provides that at the end of each year, the interest rate for the prior year will be determined by reference to a nonqualified interest index (i.e., an index that would not qualify as an objective interest index within the meaning of Prop. Treas. Reg. § 1.1275-5(b), 51 Fed. Reg. 12022, 12094 (1986)), and that such interest will be payable at maturity. Assume that the second instrument provides that a week after issuance, an interest rate will be set on the bond. Once set, interest will be payable annually at the fixed rate. In the first example, the fixing of the contingent interest relates to the already elapsed year and is properly accrued under the rules. In the second example, the fixing of the contingent interest relates to interest that has not yet accrued and should not be taken into income until such time as it has properly accrued.


1272(a)(6), the accrual of discount in each period would be computed by reference to an assumed prepayment rate for the pool of mortgages determined as of the time of the issuance of the debt and the actual prepayment behavior to date. Thus, section 1272(a)(6) can be viewed as a highly sophisticated approach to estimating the timing of income and adjusting the estimates as facts prove to be inconsistent with the initial assumption.

412. Id. § 1272(a)(6)(A)-(B).
Appendix D: The Treatment of Correlated Events

In general, this Article recommends dividing a financial instrument into components, each with a single contingency, and taxing each component based on the expected future value of the contingency. While this approach clearly makes sense when the contingencies are independent, it is less obviously correct when the contingencies are correlated. In Example 7, which deals with a bet on the next two presidential elections,\(^{413}\) I suggested that one approach was to value the second contingency at the time the first contingency was resolved based on the conditional probabilities determined at the time the contract was initially entered into.\(^{414}\) That approach was rejected based on its additional information requirements, namely the conditional probabilities. In this Appendix, the question of the correlation between contingencies is explored further in a more rigorous manner.

Consider two bets concerning events \(a\) and \(b\), which may or may not occur at time \(t_1\) and time \(t_2\), respectively.\(^{415}\) At \(t_0\), the probability of the events are \(p_0(a)\) and \(p_0(b)\), respectively. If events \(a\) and \(b\) are uncorrelated, the probability of event \(b\) occurring will be unaffected by whether or not event \(a\) occurs. In other words:

\[
p_t(b | a) = p_t(b | \neg a) = p_t(b).
\]

Assume now that events \(a\) and \(b\) are correlated so that:

\[
p_t(b | a) \neq p_t(b).
\]

Consider the extent to which this information should be used at different points in time.

<table>
<thead>
<tr>
<th>Time</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>(t = t_0)</td>
<td>The initial estimate of the probability of event (b) should take into account all information that is available at (t_0), whether or not event (b) is correlated with event (a).(^{416}) Thus, whether or not the events are correlated, the procedure at (t_0) should be the same, (i.e.,) the best estimate should be made of the probability of event (b).</td>
</tr>
</tbody>
</table>

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413. See supra text accompanying note 239.
414. See supra text accompanying note 242.
415. The term \(t_n\) will be used to refer to the point in time where time is equal to \(n\).
416. By the term "all information," I really mean all reasonably available information, taking into account the transaction costs of obtaining the information.
This is the period from when the bet is entered into until the outcome of the first event is known. By observing the behavior of event $a$ during this period, we would obtain more information about event $b$. Hence, it would be possible to update our probability estimates and accrue income accordingly. To do so would, however, be inconsistent with our general decision to avoid updating our information about event $a$. If we had an updated estimate of $p(a)$, the first step should be to adjust the accrual of income with respect to event $a$, not event $b$. Moreover, it is not necessarily the case that it is easier (i.e., cheaper) to obtain updated information about event $a$ than it would be to obtain such information about event $b$.\footnote{Although this may often be the case because event $b$ is, by hypothesis, further in the future than event $a$.} Given that it would be more accurate to directly update the estimate of the probability of event $b$, the fact that such a course of action has been rejected suggests rejecting the indirect updating of the estimate.

At $t = t_1$, the occurrence or nonoccurrence of event $a$ is known with certainty. It would therefore be possible to determine either:

$p_1(b | a)$,

the probability of $b$ given the now known value of $a$ and all other information known at time $t_1$, or:

$p_0(b | a)$,

the probability of $b$ given the known value of $a$, but otherwise taking into account only information known at $t_0$.

As for the first alternative, it is exactly the same as $p_1(b)$ (the probability of event $b$ given all information known at $t_1$), because all of the information known at $t_1$ includes the outcome of event $a$. The alternative of periodically re-evaluating $p(b)$ has, however, already been rejected.

The second alternative, adjusting the accrual of income with respect to event $b$ based on the initial probability of event $b$ conditioned on the
outcome of event $a$, takes into account only information known as of $t_0$ plus the known outcome of event $a$. It is, therefore, not inconsistent with the overall approach. On the whole, however, this adjustment seems to reach an undesirable level of complexity, although it may be reasonable under some circumstances. This possibility, which I will refer to as adjusting for related outcomes, is discussed more fully below.

$t_1 < t < t_2$

This is the period between the outcome of event $a$ and the outcome of event $b$. Whether or not the estimate of the probability of event $b$ was adjusted at time $t_1$, the correlation between events $a$ and $b$ should have no further relevance after time $t_1$. Accordingly, there is no reason to vary the general rule that probabilities will not be updated until the underlying contingency is resolved.

$t = t_2$

Event $b$ is no longer contingent.

As discussed above, a case can be made for adjusting the estimate of the expected value of a future event based on the resolution of intermediate contingencies and their expected interactions as determined at the initiation of the transaction. In general, however, such an approach is unlikely to be cost effective. The most significant problem is that it would require determining the conditional probabilities at the initiation of the transaction. Such a determination is likely to be much more difficult than determining unconditional probabilities. In particular, while reasonable estimates of unconditional expectations can frequently be inferred from market prices, it is unlikely that estimates of conditional probabilities will be so determinable.

More broadly, there is no intrinsic reason why updating expected values based on conditional probabilities would have to be limited to events that are themselves connected with the financial instrument. For example, consider a six-month forward contract on corn and assume that the key determinate of the price of corn in six months is the amount of rainfall over the next three months. In particular, assume that in February the August forward price for corn is $2.00 per bushel, but that if there is less than one inch of rain in April, all else being equal, it is expected that August corn will be $3.00 per bushel. Finally, assume that there is in fact less than one inch of rain in April. A possible approach would be to revalue the forward contract on May 1 assuming that nothing else has
changed other than the low rainfall. While it might enhance accuracy to adjust for such extrinsic outcomes, it is unlikely that it would be worthwhile to do so.

The failure to adjust for extrinsic outcomes, however, suggests an additional problem with updating based on intrinsic outcomes: the taxation of any component of a financial instrument would then become dependent on the other components of the instrument. For example, the taxation of the corn forward in the previous example would depend on whether or not it was tied to a separate bet on the amount of rainfall or perhaps a bet on wheat prices (assuming that wheat prices are themselves correlated with rainfall). 418

For all of the above reasons, I would reject using conditional probabilities to update estimates of future contingencies. Accepting this conclusion as a general rule, the question remains as to whether there are special cases where there is so much information contained in either intrinsic or extrinsic events that it seems foolish to ignore such information. Such a case is presented when the two events are perfectly correlated, either negatively or positively. 419

The problem of perfectly correlated events can be demonstrated by a simple example. Consider a jar with two balls, one red and one white. Assume that one ball will be removed at t1 and the other ball will be removed at t2. Consider a pair of bets where the first bet pays $100 if the red ball is removed at t1 and the second bet pays $100 if the red ball is removed at t2. Ignoring the time value of money, each bet should be worth $50. 420 Assume that you have paid $100 for the pair of bets and that the white ball is drawn at t1. Since your basis in the first bet will be $50, you will have a loss of $50 on the first bet. Economically, however, your loss of $50 on the first bet is exactly offset by your certain gain of $50 on the second bet. 421 It would seem undesirable to permit the loss on the first bet without taking into account the certain gain on the second bet. A solution to this dilemma is to re-evaluate the expected outcome of the second bet based on the first bet, in other words, to use the conditional probabilities. A simpler approach, however, is to simply observe that the second bet is no longer contingent once the first bet has been resolved.

418. If probability were updated based on intrinsic outcomes, it would no longer be true that the timing of income with respect to a financial instrument is independent of whether or not the instrument is bifurcated into its component parts. See supra subpart V(A).

419. By a perfect positive correlation I mean that the occurrence of event a implies the occurrence of event b. Perfect negative correlation means that the occurrence of event a implies the nonoccurrence of event b.

420. There is a 50% chance that the red ball will be drawn at t1. The value of the first bet is therefore .5 times $100, or $50. The argument is exactly the same for t2.

421. You will receive $100 when the second ball is drawn and you have a basis in the second bet of $50.
Thus, under the general rule that income is recognized when contingencies are resolved, a gain of $50 should automatically be recognized with respect to the second bet without any need to formally consider conditional probabilities.\textsuperscript{422} Similarly, if a red ball is drawn at $t_1$, a loss should be permitted with respect to the second bet, now a certain loser.