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Imperfect Financial Markets and the Hidden Costs of a Modern Income Tax

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IMPERFECT FINANCIAL MARKETS AND THE HIDDEN COSTS OF A MODERN INCOME TAX

*Adam H. Rosenzweig**

ABSTRACT

The news has been filled with stories of meltdowns in the financial world, with the government, independent agencies, and politicians all devoting significant time and energy to coping with the consequences. As investment banks, hedge funds, and mortgage lenders continue to suffer massive losses, the government and its agents are left to try to pick up the pieces. But what if, in addition to these more transparent problems, additional hidden costs from the financial crisis were being borne by the government in some other way? Even worse, what if the government had implicitly underwritten some of them in the first place? Building on insights from recent finance literature, this Article contends that the government could in fact bear such hidden costs through the interaction of a unique and underappreciated imperfection in the operation of public financial derivatives markets—the pricing of counterparty credit risk—and an income tax on risky investments. Under relatively conservative assumptions, such an approach can produce a surprising result: the imposition of a facially neutral income tax can actually serve to subsidize certain speculators in financial derivatives, both in the model and as extrapolated to the real world. In other words, an income tax in a world with imperfect financial markets can actually provide incentives to speculators to undertake excessively risky behavior, with the government ultimately bearing the cost.

These conclusions demonstrate the urgent need for a more comprehensive approach to the taxation of financial derivative markets than has traditionally been undertaken, expanding the analysis beyond particular transactions to incorporate markets, traders, speculators, and investors more broadly. This Article does so by proposing the adoption of a derivatives trading tax, not as a supplement to or replacement for, but rather as

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an integral part of, the income tax regime. Such a tax would not only offset the costs of imperfect financial markets borne by the government through the income tax, but could also ameliorate the suboptimal excess risk in the financial markets in the first place. By redefining the terms of the debate in this manner, a more efficient overall taxation regime can be crafted, while maintaining the normative goals of an income tax.

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“Wall Street got drunk . . . and now it’s got a hangover. The question is, [h]ow long will it sober up [sic] and not try to do all these fancy financial instruments?”

—President George W. Bush¹

I. INTRODUCTION

THE news has been filled with stories of defaults and meltdowns in the financial world with the government, independent agencies, and politicians all devoting significant time and energy to coping with the consequences.² As investment banks, hedge funds, insurance companies, and mortgage lenders continue to suffer massive losses, the government and its agents are left to try to pick up the pieces.³ But what if, in addition to these more transparent problems, additional hidden costs from the financial crisis were being borne by the government some other way? Even worse, what if the government had implicitly underwritten some of them in the first place? Building on insights from recent finance literature, this Article contends that the government can in fact bear such hidden costs, through the previously unexplored interaction of an income tax with the modern workings of imperfect financial markets.

It has long been understood that an income tax serves to place the government in a form of partnership with taxpayers with respect to their risky investments.⁴ What had been less clear for a number of years was whether, and to what extent, taxpayers and the government could avoid this result. Surprisingly, economic theory provides that, under a number of assumptions, relatively simple changes by both taxpayers and the government can result in risky returns (such as bets on sporting events or speculation on the price of oil) avoiding the impact of an income tax alto-

1. Sheryl Gay Stolberg, *A Private, Blunter Bush Declares, ‘Wall Street Got Drunk,’* N.Y. TIMES, July 23, 2008, at A18.

2. These include the potential default or bankruptcy of some of what had previously been perceived as the most credit-worthy counterparties in the world, such as investment banks, mortgage brokers, collateralized debt pools, and credit insurers. See, e.g., Herb Greenberg, *General Growth’s Indebtedness Raises Fears Among REIT Investors*, WALL ST. J., Jan. 19, 2008, at B3; Kate Kelly, *Lost Opportunities Haunt Final Days of Bear Stearns*, WALL ST. J., May 27, 2008, at A1; Susan Pulliam & Serena Ng, *Default Fears Unnerve Markets: Partners in Credit Deals Face Big Write-Downs As Bond Insurer Teeters*, WALL ST. J., Jan. 18, 2008, at A1; Aparajita Saha-Bubna & Joseph Checkler, *Fannie, Freddie Woes Worse Than Bear’s in Some Ways*, WALL ST. J., July 14, 2008, at A13; Nick Timiraos, *Behind the U.S. Mortgage Mess*, WALL ST. J., Aug. 11, 2007, at A7; Louise Story & Ben White, *The Road to Lehman’s Failure Was Littered With Lost Chances*, N.Y. TIMES, Oct. 6, 2008, at B1.

3. See, e.g., Doug Cameron, *Hedge Funds Fear Backlash From Congress*, WALL ST. J., June 25, 2008, at B5; Mark Gongloff, *Driving Away Oil Speculators May Not Help*, WALL ST. J., June 24, 2008, at C1; Ian Talley & Gregory Meyer, *Oil Speculation Draws Scrutiny*, WALL ST. J., June 24, 2008, at A3.

4. This is because the government shares in the winnings of taxpayers by taxing them, but also bears a share of the losses of taxpayers by allowing deductions which reduce taxes. See, e.g., Christopher H. Hanna, *Demystifying Tax Deferral*, 52 SMU L. REV. 383, 388-89 (1999); David A. Weisbach, *The (Non)Taxation of Risk*, 58 TAX L. REV. 1, 3 (2004).

gether.⁵ More specifically, the theory provides that taxpayers can effectively nullify the impact of an income tax on their risky investments simply by increasing the nominal amount of their investments, while the government can sell its share back into the private market.⁶ The formalized version of this, often referred to as the “taxation and risk” model, has revolutionized the way income taxes have been analyzed.⁷

What has become increasingly clear in light of recent economic events, however, is that modern financial markets have created new, unique, difficult to detect, and difficult to price risks that do not necessarily fit neatly into this model – in other words, modern financial markets are imperfect.⁸ This Article will focus on one such example: markets in financial derivatives used to replicate investments in underlying assets. In their most basic form, financial derivatives are nothing more than contracts between two parties with respect to some reference, or stated more simply, financial derivatives are a form of bet between two parties. Just like all bets, financial derivatives are valuable only if both the bet wins and the losing party can pay.⁹ Although this risk of non-payment can theoret-

5. See, e.g., Weisbach, *supra* note 4, at 1-2.

6. See *id.* For a detailed explanation of the taxation and risk model, see *infra* Part III.A.

7. The taxation and risk literature has made an invaluable contribution to understanding the nature, incidence, and distributive impact of an income tax, and has served as the foundation for the modern choice of tax base debate. See, e.g., Joseph Bankman & David A. Weisbach, *The Superiority of an Ideal Consumption Tax Over an Ideal Income Tax*, 58 STAN. L. REV. 1413, 1415-16 (2006). Proponents of replacing the income tax with a consumption tax contend that this model establishes that an income tax is both ineffective in raising necessary revenue and inefficient in trying to tax returns on capital investment. See generally David A. Weisbach, *The Case for a Consumption Tax*, 110 TAX NOTES 1357 (2006). Proponents of the income tax counter that abandoning an income tax could violate norms of distributive justice inherent in an income tax, under the theory that those with little to no capital investments—mostly working poor—would be forced to bear a greater proportion of the total tax burden. See, e.g., Martin J. McMahon Jr., *An Income Tax Is Superior to a Wage or Consumption Tax*, 110 TAX NOTES 1353, 1353 (2006); Lawrence Zelenak, *The Sometimes-Taxation of the Returns to Risk-Bearing Under a Progressive Income Tax*, 59 SMU L. REV. 879, 893-94 (2006). Regardless, due to the results of this model, the debate over income versus consumption tax has primarily focused on the taxation of risk. See Joseph Bankman & Thomas Griffith, *Is the Debate Between an Income Tax and a Consumption Tax a Debate About Risk? Does it Matter?*, 47 TAX L. REV. 377, 378 (1992).

8. See, e.g., P. Jean-Jacques Herings & Karl Schmedders, *Computing Equilibria in Finance Economies with Incomplete Markets and Transaction Costs*, 27 ECON. THEORY 493, 494 (2006); INT’L MONETARY FUND, GLOBAL FINANCIAL STABILITY REPORT: DEVELOPMENTS AND PRACTICES 45-58 (Sept. 2004), available at <http://www.imf.org/external/pubs/ft/GFSR/2004/02/pdf/gfsr0904.pdf> [hereinafter IMF HEDGE FUND REPORT]; SEC STAFF REP., IMPLICATIONS OF THE GROWTH OF HEDGE FUNDS 64 (Sept. 2003), available at <http://www.sec.gov/news/studies/hedgefunds0903.pdf> [hereinafter SEC HEDGE FUND REPORT]. See also PRESIDENT’S WORKING GROUP ON FIN. MKTS., HEDGE FUNDS, LEVERAGE, AND THE LESSONS OF LONG-TERM CAPITAL MANAGEMENT 15 (1999), available at <http://www.us.treas.gov/press/releases/reports/hedgfund.pdf> [hereinafter PRESIDENT’S WORKING GROUP REPORT].

9. This concept has been explored in other contexts. See generally Lynn A. Stout, *Betting the Bank: How Derivatives Trading Under Conditions of Uncertainty Can Increase Risks and Erode Returns in Financial Markets*, 21 J. CORP. L. 53 (1995). In effect, by “decoupling” economic exposure to an asset from actual ownership, derivatives introduce unique risks and considerations into the analysis, including that sophisticated financial in-

ically be priced into the derivative, recent finance literature has determined that this risk of default can, and likely has, become a *structural* component of liquid derivatives markets, which can be neither fully priced nor diversified away by investors.

The primary contribution of this Article will be to incorporate this lesson into the taxation and risk model, uncovering implicit costs in the income taxation of derivatives so that such costs can be taken into account in designing a more equitable and efficient tax regime.¹⁰ Under this approach, since the government can be thought of as sharing in all the risky investments of taxpayers through the income tax, the imposition of even a facially neutral income tax can mean that the government also indirectly bears a portion of the unpriced default risk in the liquid derivatives markets. As a result, speculators in risk benefit from an incremental positive risk-adjusted net present value in such investments, creating incentives to invest in risky investments beyond optimal levels. In addition, and perhaps even more troubling, the income tax itself could be thought of as creating incentives to taxpayers to increase investments in derivatives as a means to avoid the income tax, exacerbating this effect.

Taken together, these consequences could lead to a form of downward spiral: as demand for derivatives increased due to the income tax, the need for supply of derivatives would increase as well, bringing riskier counterparties into the market, increasing the amount of default risk in the market as a whole, furthering the amount of such risk indirectly assumed by the government through the income tax as well. In other words, through the imposition of even a facially neutral income tax in a world with imperfect financial markets, the government could be thought of as “subsidizing” financial speculators, both by creating demand for derivatives by investors *ex ante* and bearing a portion of the default risk of speculators *ex post*.

In response, this Article will introduce a new, more comprehensive approach to the taxation of financial derivative markets,¹¹ expanding the analysis to incorporate markets, traders, speculators, and investors more broadly, by proposing the adoption of a derivatives trading tax, not as a

vestors such as hedge funds have become experts in exploiting the opportunities presented by decoupling in the modern financial markets. See Henry T. C. Hu & Bernard Black, *The New Vote Buying: Empty Voting and Hidden (Morphable) Ownership*, 79 S. CAL. L. REV. 811 (2006) (hereinafter *Decoupling I*).

10. The literature has lamented that more has not been done with the taxation and risk model. See Weisbach, *supra* note 4, at 3-4 (“The taxation and risk literature and the conclusions that follow from it, however, do not appear to have been widely accepted. . . . Because there has been no article or commentary arguing that the literature is flawed, one is left to imagine the reasons why it has not been accepted.”).

11. The traditional legal approach to the taxation of financial derivatives—targeting specific financial transactions on a case-by-case basis—has proven less than effective in broadly defending the income tax base against the engineering of the modern financial markets. See, e.g., Michael S. Knoll, *Financial Innovation, Tax Arbitrage, and Retrospective Taxation: The Problem With Passive Government Lending*, 52 TAX L. REV. 199, 199-200 (1997); Alex Raskolnikov, *Relational Tax Planning Under Risk-Based Rules*, 156 U. PA. L. REV. 1181, 1183 (2008).

supplement or replacement for, but rather as an integral part of, the income taxation of financial derivatives. Under this analysis, the need for and structure of a derivative trading tax would derive from the lessons learned by introducing derivatives into the taxation and risk model, rather than from exogenous concerns with the functioning of the markets or as an independent means to raise revenue.¹² Although not part of the income tax base, the derivative trading tax would be intended to partially offset the distortions caused by the government bearing default risk through the income tax, and thus would be part of crafting a more comprehensive income tax regime. By redefining the terms of the debate in this manner, a more efficient overall taxation regime can be crafted, while maintaining the normative goals of an income tax.

Part II of this Article will begin by describing and analyzing recent insights from the finance literature on the structure of modern financial derivatives markets, identifying liquidity-based default risk as a recent and unique risk which can neither be fully priced nor diversified away by investors. Part III will then, for the first time, introduce this new unpriced risk into the taxation and risk model to analyze the impact on the incidence and distribution of an income tax, concluding that even a facially neutral income tax can serve to subsidize financial speculators. Part IV will extrapolate the conclusions from the model, demonstrating that even under certain restrictions of the real world, both investors in derivatives and taxpayers more generally can effectively subsidize such speculators through the income tax. Part V will then utilize this insight to frame some of the normative implications, first as to speculators specifically, and then to the taxation of modern financial markets more generally, demonstrating how this approach can alter the agenda regarding the proper structure of an income tax in a world with imperfect financial markets.

II. MODERN FINANCIAL MARKETS, DERIVATIVES, AND RISK

An analysis of the taxation of financial derivatives must begin with the economics of financial derivatives and the markets upon which they

12. This exercise is a legal undertaking, notwithstanding that it requires delving into the detailed mechanics of financial markets and derivatives, because crafting the institutions and mechanisms necessary to implement a fair, efficient, and effective income tax is itself a legal undertaking. See generally Michael A. Livingston, *Reinventing Tax Scholarship: Lawyers, Economists, and the Role of the Legal Academy*, 83 CORNELL L. REV. 365 (1998); Marin Roger Scordato, *Reflections on the Nature of Legal Scholarship in the Post-Realist Era*, 48 SANTA CLARA L. REV. 353 (2008); William J. Turner, *Tax (And Lots of Other) Scholars Need Not Apply: The Changing Venue for Scholarship*, 50 J. LEGAL EDUC. 189, 190 (2000). Such an approach has proven successful in other areas of the law. See, e.g., Richard A. Booth, *Discounts and Other Mysteries of Corporate Finance*, 79 CAL. L. REV. 1053, 1056 (1991); Henry T. C. Hu, *Risk, Time, and Fiduciary Principles in Corporate Investment*, 38 UCLA L. REV. 277, 279-80 (1990); Lynn A. Stout, *How Efficient Markets Undervalue Stocks: CAPM and ECMH Under Conditions of Uncertainty and Disagreement*, 19 CARDOZO L. REV. 475, 478-80 (1997).

trade. Specifically, it is necessary to understand the crucial role that speculators play in such markets and the risks they create before such costs can be introduced into the taxation and risk model. What can be discovered is that the unique combination of the business model of modern financial speculators and the mechanics of modern derivative markets can lead to unpriced default risk being imposed on the market.¹³ Such risk is recent, significant, and difficult to measure, and has fundamentally reshaped the allocation of risk in the financial markets.

That speculators introduce this risk into the derivatives markets does not necessarily mean that such risk is undesirable or that regulation is necessary; it is possible that markets willingly take on such risk in exchange for liquidity, while it is also possible that regulation could increase the transparency of such risks.¹⁴ Regardless of any regulatory response, however, what is important to the income tax analysis is that a unique and difficult to measure risk has been introduced into the modern financial marketplace that cannot be completely eliminated through regulation, pricing, or arbitrage. By examining and understanding such risk, it can then be introduced into the taxation and risk model so as to identify any resulting distortions to the income tax base and thus craft the proper normative and prescriptive responses.

A. FINANCIAL DERIVATIVES, RISK, AND DECOUPLING

Financial derivatives are unique assets in many respects; in particular, financial derivatives permit willing counterparties to bet on a risky asset without investing capital in the asset itself precisely because, in their simplest form, financial derivatives are nothing more than executory contracts between two parties based on the value of some reference.¹⁵ The name “derivative” indicates its fundamental nature, that is, the contract has no inherent financial value but rather derives its value from the underlying reference.¹⁶ Stated more simply, two parties bet on the future

13. Ben Bernanke, Chairman of the Federal Reserve, stated in a recent speech: Much of the recent debate . . . has focused on the opacity of hedge funds to regulatory authorities and to the markets generally, which is viewed by some as an important source of liquidity risk. Liquidity in a particular market segment might well decline sharply and unexpectedly if hedge funds chose or were forced to reduce a large exposure in that segment.

Ben S. Bernanke, Chairman, Bd. of Governors, Fed. Reserve Sys., Speech at the Fed. Reserve Bank of Atlanta's 2006 Financial Markets Conference (May 16, 2006), available at <https://www.federalreserve.gov/newsevents/speech/Bernanke20060516a.htm>.

14. See, e.g., Troy A. Paredes, *On the Decision to Regulate Hedge Funds: The SEC's Regulatory Philosophy, Style, and Mission*, 2006 U. ILL. L. REV. 975.

15. See, e.g., Henry T. C. Hu, *Misunderstood Derivatives: The Causes of Informational Failure and the Promise of Regulatory Incrementalism*, 102 YALE L.J. 1457, 1464-65 (1993); Peter H. Huang, *A Normative Analysis of New Financially Engineered Derivatives*, 73 S. CAL. L. REV. 471, 483-84 (2003); Kimberly D. Krawiec, *More Than Just "New Financial Bingo": A Risk-Based Approach to Understanding Derivatives*, 23 IOWA J. CORP. L. 1, 46 (1997).

16. See Huang, *supra* note 15, at 483. The classic example is a stock option, which is the right (but not the obligation) to purchase a share of stock in the future at a set price – if the stock increases in value the option is valuable while if the stock decreases in value it is

price of an asset. Since derivatives always involve a bet, they also require two parties, each willing to accept offsetting risks.¹⁷ What is not required, however, is the underlying asset itself.¹⁸ For this reason, it is possible for the amount of money at risk in the derivatives markets to exceed the entire value of all financial assets in the world.¹⁹

Due to this unique feature of derivatives, investment in an asset can be “decoupled” from ownership of the underlying asset itself.²⁰ It has recently been demonstrated that derivatives can significantly change the understanding of voting rights and influence on public corporations due to this decoupling phenomenon.²¹ This Article will focus on a different variation of the decoupling problem – that by investing in a derivative an investor need not own the underlying asset, but in exchange must accept a new and unique risk: the risk that the counterparty may default. This could be thought of as a form of “risk decoupling” in that it is precisely the decoupling of the economic investment in an asset from actual ownership of that asset which introduces counterparty default risk into the discussion.

More specifically, financial derivatives permit willing counterparties to replace upfront capital investments with contingent liabilities.²² In other words, each side promises to pay the other if they lose the bet, but neither of the parties knows at the time of the execution of the derivative whether they will be the winner or loser (that is, whether the derivative will ultimately be an asset or liability in their hands). Whether the derivative is an asset or liability depends on the movement in price of the un-

not. *See id.* Options are not the only type of financial derivative. For example, a forward contract is a bilateral executory contract to purchase a share of stock in the future at a fixed price that is mandatory for both parties, while a futures contract is a type of forward contract traded on a regulated exchange. A notional principal contract (NPC) is an executory contract to make payments between the parties as if they had invested a notional amount in an underlying asset. *See, e.g.,* René M. Stulz, *Should We Fear Derivatives?*, 18 J. ECON. PERSP. 173, 174-76 (2004). The classic NPC is the interest rate swap. *Id.*

17. *See* David M. Schizer, *Balance in the Taxation of Derivative Securities: An Agenda for Reform*, 104 COLUM. L. REV. 1886, 1904 (2004) (“To enter into a derivative, the principal requirement is a willing counterparty. A long needs to find a short, and vice versa.”).

18. *See* Stout, *supra* note 9, at 66 (“Derivatives transactions by definition do not involve the purchase of an underlying asset, but rather amount to side bets on the movement of some rate, price, or index.”).

19. *See* Jacob Leibenluft, *\$596 Trillion!: How Can the Derivatives Market Be Worth More Than the World's Total Financial Assets?*, SLATE, Oct. 15, 2008, <http://www.slate.com/id/2202263>.

20. *See Decoupling I, supra* note 9.

21. *See, e.g.,* Henry T. C. Hu & Bernard Black, *Equity and Debt Decoupling and Empty Voting II: Importance and Extensions*, 156 U. PA. L. REV. 625 (2008) (hereinafter *Decoupling II*); *Decoupling I, supra* note 9.

22. *See, e.g.,* Schizer, *supra* note 17, at 1902 (“The key point is that the parties to a standard [derivative] do not part with the use of any money upon entering into the contract—whether they are long or short—and thus do not earn a return for time value.”). Alternatively, a counterparty could require an upfront deposit, in which case the derivative would be “prepaid” with an upfront capital investment. Since these deposits serve more in the nature of security than capital investment, the only difference is the time value of the deposit during the life of the derivative. Solely for these purposes, therefore, it is sufficient to treat prepaid derivatives the same as non-prepaid derivatives.

derlying asset, which can change over the life of the derivative contract depending on the volatility of the underlying asset. In effect, all financial derivatives have “embedded” leverage; the only issue is the directionality of the net liability at any given time given the price of the underlying asset.²³

It is for this reason that derivatives permit an easy way to generate leveraged returns on investments in risk.²⁴ This benefit is not free, however. Rather, the investor must take on the default risk exposure of a counterparty if, but only if, the investor wins the risky bet in the derivative contract (or they would be the “creditor” in the embedded debt of the counterparty).²⁵ In other words, every derivative investor bears contingent default risk.²⁶

Why do investors in derivatives agree to bear this default risk in the first place? If there were no other way to make such an investment, investing in a derivative might make sense notwithstanding this new risk component. Under financial theory, however, derivatives are “redundant” instruments, meaning there is no net investment that can be made with a derivative that could not be made through some combination of the underlying financial assets themselves.²⁷ Thus, there would be no need for derivatives to exist if engaging in the underlying transactions was possible at the same cost as entering into the derivative. Rather, derivatives exist because they permit investors to gain exposure to such invest-

23. A derivative contract is similar to each counterparty borrowing funds from the other to invest in the underlying asset, in opposite directions. This phenomenon can be demonstrated by an application of the well-known “put-call parity” theorem. Under put-call parity, an investment in a risky asset can be identically replicated through a combination of a put on the risky investment, a call on the risky investment, and debt. Put-call parity provides that for any risky investment S , holding S plus a put on S (that is, the right to sell S at a fixed price) is equivalent to holding debt plus a call on S (that is, the right to buy S at a fixed price), so long as the “strike” price of the put and call are both the current price of S and the debt is that of the issuer of S . In formulaic terms, $S + P = D + C$. See, e.g., Michael S. Knoll, *Put-Call Parity and the Law*, 24 CARDOZO L. REV. 61, 64-74 (2002). Applying simple algebra, a call option is equal to borrowing to buy stock and a put ($C = S + P - D$), while holding a call and writing a put is identical to borrowing to buy stock ($C - P = S - D$). So for any non-optional derivative E , which is identical to holding a call and writing a put, the formula would be $E = S - D$. In other words, holding a long derivative is identical to borrowing to buy stock, while holding a short derivative is the same as shorting stock and using the proceeds to buy debt. See *id.* This example oversimplifies the analysis, but is a useful illustration of the embedded debt in a derivative.

24. See, e.g., Frank Partnoy, *Financial Derivatives and the Costs of Regulatory Arbitrage*, 22 J. CORP. L. 211, 217 (1997).

25. See, e.g., Darrell Duffie & Ming Huang, *Swap Rates and Credit Quality*, 51 J. FIN. 921, 921-22 (1996); Hu, *supra* note 15, at 1468; Keith Sill, *The Economic Benefits and Risks of Derivative Securities*, FED. RESERVE BANK OF PHILA. BUS. REV., Jan.-Feb. 1997, at 15 (1997), available at <http://www.philadelphiafed.org/files/br/brjf97ks.pdf>.

26. See, e.g., Ian A. Cooper & Antonio S. Mello, *The Default Risk of Swaps*, 46 J. FIN. 597, 598 (1991); Hu, *supra* note 15, at 1468.

27. For example, a call option on a share of stock has the same cash flows as if an investor borrowed cash to acquire the stock at the strike price on a nonrecourse basis. See, e.g., Knoll, *supra* note 23, at 79-80; see also SALIN N. NEFTCI, AN INTRODUCTION TO THE MATHEMATICS OF FINANCIAL DERIVATIVES (2d ed. 2000).

ments at substantially reduced transaction costs.²⁸ To the extent that bearing default risk in the derivative is cheaper than the transaction costs of investing in the comparable underlying assets, it could make sense for an investor to use a derivative to invest in a particular asset rather than buying the asset itself. This makes the pricing of default risk crucially important in such a decision.

B. THE UNEASY RELATIONSHIP BETWEEN PRICE AND DEFAULT RISK IN FINANCIAL DERIVATIVES

To be able to accurately price the default risk of a counterparty into a derivative contract, an investor must know the investment profile of the counterparty to the derivative contracts, since different investors enter into derivatives for different reasons: some attempt to hedge risk exposure, others try to maximize risky bets, and still others purely gamble on the future. The underlying reason for a counterparty to enter into the derivative informs the default risk of such counterparty as well – the more speculative the counterparty, the greater the default risk.²⁹

The classic counterparty to a derivative is the hedging investor.³⁰ For example, a firm may issue floating rate interest debt but prefer fixed rate risk exposure³¹ because of low cash flows in the short term which could cause the firm to default on its interest payments.³² Firms with substantial equity value will have a strong incentive to hedge in this manner,³³ so as to protect against risks that could impact their total return, which are

28. See, e.g., Sill *supra*, note 25, at 15. For example, it would be much simpler to enter into a single interest rate swap than to sell floating rate debt instruments short to finance the purchase of fixed rate debt instruments. See James Bicksler & Andrew H. Chen, *An Economic Analysis of Interest Rate Swaps*, 41 J. FIN. 645, 651 (1986). To utilize underlying assets, it would be necessary to find two issuers to engage in two different transactions each time the swap payment is to be made. In effect, the swap acts as a series of forward contracts on the underlying interest rate. See, e.g., Robert H. Litzenberger, *Swaps: Plain and Fanciful*, 47 J. FIN. 831, 833 (1992).

29. See, e.g., Robert A. Jarrow & Stuart M. Turnbull, *Pricing Derivatives on Financial Securities Subject to Credit Risk*, 50 J. FIN. 53, 53-54 (1995).

30. The hedging investor seeks to offset a sub-optimal risk position through entering into an offsetting derivative position. See Stout, *supra* note 9, at 55.

31. This could occur, for example, because the floating rate market is the most liquid debt market, because it has lower transaction costs than fixed rate debt, or because of market failures that allow arbitrage pricing between the fixed and floating rate debt markets. See Bicksler & Chen, *supra* note 28, at 651.

32. Such a firm could prefer a fixed rate of interest due to the differing *variance* of the two risk portfolios. See Stout, *supra* note 9, at 55 (“Although the futures purchase would not increase the . . . net earnings, it would reduce the variation in those earnings by offsetting a pre-existing business risk with a carefully selected, counterbalancing derivatives risk.”). This can be true notwithstanding the fact that the risk-adjusted present values of the loans are equal. See Christopher Geczy et al., *Why Firms Use Currency Derivatives*, 52 J. FIN. 1323, 1330 (1997).

33. More specifically, assuming that equity holders of a firm with risky debt have a payout function similar to that of an option on the assets of the firm, the incentive to increase the variance of the cash flows of the firm (and thus increase the risks of bankruptcy costs) depends on the relative elasticity of the price movement of the option to the volatility of the price of assets, or the “vega” of the option. If the option is at or in the money, as would be the case where there is significant equity value in excess of risky debt, the vega on the option is low, and thus equity holders have low incentives to increase cash

independent of, and unrelated to, the success of the underlying business.³⁴ In addition to hedging investors, however, two types of speculative investors may act as counterparties: (1) rational speculators, or those whose business model permits taking on certain amounts of speculative risk; and (2) pure risk seekers, or gamblers who make uncovered bets on risk.³⁵

A hedging counterparty to a derivative contract will be the least likely to default on the contract, since the derivative will be covered by the hedge. The rational speculator is more likely to default on an obligation than the hedging investor, since the obligation to pay would be supported not by a hedge but only by the other assets of the business. The pure gambler is the most likely to default on the obligation under the derivative contract, since the gambler would only be able to satisfy a losing bet out of other unrelated proceeds. Absent information as to the identity of the counterparty, an investor could enter into otherwise apparently identical derivative contracts but bear different levels of default risk.³⁶

In an efficient market, this differential risk profile would be known to the investor and priced into the terms of the derivative contract itself.³⁷ The problem with the derivatives market is that it is not wholly efficient; rather, derivatives markets exist precisely due to the presence of market

flow variance. See Abon Mozumdar, *Corporate Hedging and Speculative Incentives: Implications for Swap Market Default Risk*, 36 J. FIN. & QUANT. ANALYSIS 221, 229-30 (2001).

34. In effect, this could be thought of as a form of equity insurance. This hedging incentive does not hold indefinitely, however. If the total value of the equity exposure risk is smaller than the potential reward over time, then it may not be worth it to the equity holders to insure against unrelated risks. In other words, they can make a "free" bet on the unrelated risk. See Mozumdar, *supra* note 33, at 229-30. This incentive structure only increases as the residual equity grows smaller, until it is maximized when the residual equity is zero; in such case, equity holders would have no incentive to hedge. See *id.*

35. See Stout, *supra* note 9, at 55-57. The latter is easier to observe. Assume a firm with no assets believes that the price of gold will increase over the next year and that the market has not properly priced this increase. This firm wants to invest long in gold, but since it has no assets it cannot purchase gold. The firm could, however, enter into a derivative long gold without any up-front cash investment. If the firm is correct and the price of gold increases, the firm will make money. If the firm is incorrect and the price of gold drops, however, it will owe a liability under the derivative. It must either satisfy this liability out of other assets unrelated to the gold risk exposure, or it must default on this liability. This is the inherent aspect of "pure bet" speculation, i.e., that the bet is at most covered by unrelated assets, on the hope that the bet will win.

36. See Jarrow & Turnbull, *supra* note 29, at 53.

37. Determining the price of an option is complicated and generally was not mathematically possible prior to the advent of the Black-Scholes option pricing model in 1973. The Black-Scholes model determines the price of an option as a function of a combination of underlying factors that impact the price of the option, including the price of the underlying asset, the volatility of the underlying asset, the strike price of the option, the time to exercise, and other factors. See generally Fischer Black & Myron Scholes, *The Pricing of Options and Corporate Liabilities*, 81 J. POL. ECON. 637 (1973). The precision of the Black-Scholes model has been questioned, especially the assumption regarding underlying volatilities, but the fundamental concept has remained the primary method of valuing derivative contracts since its introduction. See generally NEFTCI, *supra* note 27; see also Gurdip Bakshi, Charles Cao & Zhiwu Chen, *Do Call Prices and the Underlying Stock Always Move in the Same Direction?*, 13 REV. FIN. STUD. 549 (2000). For purposes of this discussion, it is sufficient to focus on the price of the derivative solely as a function of the value of the underlying asset.

inefficiencies (such as transaction costs) in the trading of the underlying asset, which the derivatives serve to mitigate.³⁸ There is a tension, therefore, between the transaction cost minimization function and the information asymmetry problem³⁹ of derivatives: to learn the investment profile of a counterparty on a case-by-case basis, a potential investor would need to expend significant transaction costs,⁴⁰ while entering into a derivative without such diligence would make it more difficult to ascertain the default risk of the counterparty. In other words, in exchange for reduced transaction costs, investors in derivatives must bear, to some extent, the default risk of the counterparty.⁴¹ As a result, the lower the transaction costs of a derivatives market, the greater the chance of entering into a derivative with a speculator and bearing unpriced counterparty default risk.⁴²

C. THE RISE OF MODERN FINANCIAL SPECULATORS: HOW DEFAULT RISK WAS POOLED AND MAGNIFIED ON LIQUID DERIVATIVE MARKETS

Since the extent to which investors bear unpriced default risk turns on the transaction costs of the market, it follows that investors trading on markets with the lowest transaction costs are most likely to bear unpriced default risk, especially as more speculators trade on that market. Since (as discussed below) liquid markets tend to have the lowest transaction costs, the next question is—to what extent do speculators trade on such

38. See, e.g., Sill, *supra* note 25, at 24 (“In [theory], the presence or absence of derivatives has no implications for the riskiness of financial markets or the volatility of underlying assets. In reality, financial markets are not complete and there are frictions, so the presence or absence of derivatives matters for the economy.”).

39. Some contend that derivatives reduce information asymmetries by serving as a signal to the market of risk assessments of the underlying asset and thus serve an informational purpose (both in the trading of the derivative itself and in the incentives it provides to increase information gathering regarding the underlying asset). Due primarily to the role of speculators, however, the derivative market is not necessarily a signal for true demand for the underlying asset. See H. Henry Cao, *The Effect of Derivative Assets on Information Acquisition and Price Behavior in a Rational Expectations Equilibrium*, 12 *REV. FIN. STUD.* 131, 136 (1999); Massimo Massa, *Financial Innovation and Information: The Role of Derivatives When a Market for Information Exists*, 15 *REV. FIN. STUD.* 927, 927 (2002). Except with respect to certain “cash and carry” markets, it is unlikely that derivative trading consists more of information arbitrage than speculation. See *supra* note 28 and accompanying text.

40. A party could privately negotiate a derivative contract by either seeking out the optimal risk minimizing counterparty or discovering sufficient information to price default risk into the derivative contract on a case-by-case basis. Either option would require extensive information gathering and other transaction costs, likely making the derivative prohibitive, since at some point the party could hedge through the underlying assets for similar costs.

41. Edward S. Adams & David E. Runkle, *The Easy Case for Derivatives Use: Advocating a Corporate Fiduciary Duty to Use Derivatives*, 41 *WM. & MARY L. REV.* 595, 663 (2000) (“Credit risk is the risk that a counterparty will not have sufficient resources to meet the obligations contained in the contract and thus will default. Managing . . . credit risk can be difficult because the extent of exposure can change rapidly.” (internal quotations omitted)).

42. See Sill, *supra* note 25, at 24.

markets? The answer turns out to be that modern liquid markets necessarily involve highly speculative counterparties, such as hedge funds and investment banks, which pool and magnify default risk across the entire market.

Liquid derivatives markets are those which permit the ready buying and selling of financial derivatives without the need to identify a particular counterparty. Liquidity is highly valued because it significantly reduces transaction costs by permitting investment in a derivative without needing to identify any particular counterparty.⁴³ To provide liquidity, the markets must offer both fungible derivative contracts, such that an investor is indifferent as to any particular contract, and a sufficient supply of fungible derivative contracts, so that all orders can be filled on demand.⁴⁴ In general, it is unlikely if not impossible that there could be sufficient hedging investors to create a liquid market; as a result, speculators are necessary to provide liquidity.⁴⁵ The problem is that (as discussed in more detail in Part IV) many speculators are excluded from access to liquid derivative markets due to their excessive default risk. This tension—the need for liquidity trading on a derivatives market, but the unease over the presence of speculators—creates demand for pure “liquidity providers” in the market.

Liquidity providers act as speculators in the derivatives market, not to invest in the underlying risks themselves (unlike gambling speculators), but rather to provide liquidity to the market in the form of acting as a willing counterparty to risk.⁴⁶ These investors do not invest in derivatives to speculate in the price of a particular asset, but rather agree to enter into derivatives solely to make a profit by providing liquidity to the market.⁴⁷ Since liquidity providers do not seek to be exposed to a risky position but rather act as willing counterparties to risk in the liquid derivatives market, liquidity providers constantly search for offsetting positions.⁴⁸ These offsetting positions often, if not primarily, involve investments in illiquid securities or derivatives with respect to illiquid securities.⁴⁹

43. Derivatives traded on a liquid market can trade at a premium to those privately negotiated. See, e.g., Menachem Brenner et al., *The Price of Options Illiquidity*, 56 J. FIN. 789, 803 (2001) (finding a 21% discount for nontradeable currency options that could not be arbitrated away).

44. Fungibility and liquidity permit willing buyers and sellers to be matched on an as-needed basis without any particular investor being required to expend the high transactions costs of investigating or negotiating the terms of a particular derivative investment. See Krawiec, *supra* note 15, at 45-46.

45. See *id.* at 15 n.65 (“Speculators are needed . . . to provide liquidity to the derivatives market.”); see also Michael R. Powers et al., *Market Bubbles and Wasteful Avoidance: Tax and Regulatory Constraints on Short Sales*, 57 TAX L. REV. 233, 237 (2004).

46. See Myron S. Scholes, *Crisis and Risk Management*, 90 AM. ECON. REV. 17, 18-19 (2000).

47. See, e.g., Linda M. Beale, *Book-Tax Conformity and the Corporate Tax Shelter Debate: Assessing the Proposed Section 475 Mark-To-Market Safe Harbor*, 24 VA. TAX REV. 301, 390-91 (2004).

48. See Scholes, *supra* note 46, at 20.

49. *Id.*

As demand for liquidity providers by financial markets grew, a near-defunct industry in so-called “hedge funds” began looking for ways to broaden its investment base and increase its appeal to investment capital.⁵⁰ At the same time, modern financial theory was generating formulaic measurements of risk allocation, building on the groundbreaking work of the Black-Scholes option pricing model. In particular, these “quants”⁵¹ were able to deconstruct investment returns into component risks and to price these independently through the use of derivative pricing formulas. By doing so, finance theory promised to be able to create pure profit generators by focusing on sectors of the market that were underserved, but for which systemic and/or idiosyncratic risk could be mathematically eliminated.⁵²

The combination proved a type of “perfect storm” of financial investment: as derivatives markets demanded liquidity, investors sought, profit generators, and financial theorists created models that theoretically could isolate pure risk bets through liquidity provision. The combination helped spur the rise of modern financial speculation through alternative investment funds.⁵³ Investors would agree to provide capital, and the funds would agree to provide access to their financial models, in exchange for a share of the profits.⁵⁴

What resulted was a class of modern speculators, including hedge funds and certain insurance companies and investment banks, arising to serve primarily as liquidity providers to the financial derivatives markets.⁵⁵ By

50. See Sargon Daniel, Note, *Hedge Fund Registration: Yesterday's Regulatory Schemes for Today's Investment Vehicles*, 2007 COLUM. BUS. L. REV. 247, 253-54; Jonathan J. Katz, *Barbarians at the Ballot Box: The Use of Hedging to Acquire Low Cost Corporate Influence and Its Effects on Shareholder Apathy*, 28 CARDOZO L. REV. 1483, 1493 (2006). It is generally agreed that the first hedge fund was founded in 1949 by A. W. Jones. See, e.g., William Fung & David A. Hsieh, *A Primer on Hedge Funds*, 6 J. EMPIRICAL FIN. 309, 310 (1999).

51. See RICHARD R. LINDSEY & BARRY SCHACHTER, HOW I BECAME A QUANT: INSIGHTS FROM 25 OF WALL STREET'S ELITE 1-2 (2007) (“A quant designs and implements mathematical models for the pricing of derivatives, assessment of risk, or predicting market movements.’ . . . The key ingredient that ties quants to derivatives and the other two functions identified by Joshi . . . is mathematical know-how.” (internal footnote omitted)).

52. In particular, one of these types of models proposed that liquidity risk could be isolated from other types of investment risk (including default risk, legal risk, systemic risk, etc.) through the use of dynamic, or “delta,” hedging techniques. For a detailed discussion of delta hedging, see Eric D. Chason, *Naked and Covered in Monte Carlo: A Reappraisal of Option Taxation*, 27 VA. TAX REV. 135, 146-49 (2007).

53. These alpha generator funds employed quants to write financial models pursuant to which the funds could create positive returns by providing liquidity to the financial markets without exposure to the underlying risk of the reference assets (which themselves had systemic risk). See *supra* note 51.

54. As these profits grew tremendously, other more traditional financial institutions, such as investment banks, began getting into the business of providing liquidity to financial markets as well, at times with tragic results. Most did so by either forming their own internal hedge funds or contracting through hedge funds, which themselves went bankrupt in the credit crunch. See, e.g., Gretchen Morgenson, *Bear Stearns Says Battered Hedge Funds Are Worth Little*, N.Y. TIMES, July 18, 2007, at C2; Landon Thomas, Jr., *Funds Try to Lose Ties to Lehman*, N.Y. TIMES, Oct. 2, 2008, at C11.

55. See, e.g., Vikas Agarwal et al, *Liquidity Provision in the Convertible Bond Market: Analysis of Convertible Arbitrage Hedge Funds* (2007), <http://accounting.uwaterloo.ca/fi->

attempting to generate profit by taking on liquidity risk through application of their modern financial models,⁵⁶ these speculators pooled and magnified their default risk into single large counterparties. In so doing, for the first time a new, distinct, and unique form of risk was introduced into the financial markets—the risk that the liquidity providers might mismanage their own liquidity and thus default on their obligations to the market. This risk was then introduced into the financial markets themselves, since liquidity provider speculators had become indispensable to the functioning of liquid derivatives markets.

As a result, investors in the liquid derivatives market were no longer subject to the same default risk as if they had entered into a derivative with an individual counterparty, that is the risk that the particular counterparty might not have sufficient assets to pay. Rather, the risk in a market with liquidity providers is that an unforeseen shock in any one liquidity provider's illiquid positions will result in holding illiquid assets as a hedge against highly liquid derivatives, with the inability to liquidate these investments, particularly during times of economic stress.⁵⁷ In other words, liquidity providers provide liquidity to the market, but consequently impose default risk on the market.⁵⁸

nance/casf/documents/YeeChengLoon_Feb2007.pdf; see also Fung & Hsieh, *supra* note 50, at 309-10.

56. See Steven M. Davidoff, *Black Market Capital*, 2008 COLUM. BUS. L. REV. 172, 196.

57. See Antulio N. Bomfim, *Counterparty Credit Risk in Interest Rate Swaps During Times of Market Stress* (Fed. Res. Bd. Fin. & Econ. Discussion Series No. 2003-9, 2003), available at <https://www.federalreserve.gov/pubs/FEDS/2003/200309/200309pap.pdf>; Scholes, *supra* note 46, at 17 (“As a result of the financial crisis, LTCM was forced to switch from being a large supplier to being a large demander of liquidity. . . .”). For an empirical study of the effects of liquidity on corporate bond prices, see generally Francis A. Longstaff, Sanjay Mithal, & Eric Neis, *Corporate Yield Spreads: Default Risk or Liquidity? New Evidence from the Credit Default Swap Market*, 40 J. FIN. 2213 (2005) (finding that the credit derivative market absorbed most of the liquidity risk in corporate bonds, leaving the corporate bond market primarily sensitive to credit risk except in extreme liquidity cases).

58. See, e.g., Carsten Murawski & Rajna Gibson, *Default Risk Mitigation in Derivatives Markets and its Effectiveness* (EFA 2006 Zurich Meetings Paper 2006), available at <http://ssrn.com/abstract=906488>. If liquidity providers linearly hedged their derivative investments, there would be no benefit to providing liquidity, unless there were arbitrage opportunities or substantial informational asymmetries that the liquidity provider utilized to extract rents from the market. This is not generally the case, however. Rather, liquidity providers “dynamically” hedge their derivative exposure. Dynamic, or “delta,” hedging is a means of fully hedging the exposure on a non-linear derivative instrument by combining borrowing and investments in the underlying asset to minimize the exposure to changes in the price of the underlying asset (this risk to exposure in the change of the underlying asset is referred to as “delta”). See, e.g., Chason, *supra* note 52, at 146-49. The problem with delta hedging is that it must be “dynamic”—meaning that the amount of borrowing and investment must be adjusted every time the price of the underlying asset changes. See *id.* Since the ability to accurately measure delta and accurately trade debt and assets to minimize delta is limited due to transaction costs, liquidity, and modeling error, dynamic hedging errors may accumulate over time and potentially become significant; in such case, an investor could think they were fully hedged but in reality bear substantial risk. See, e.g., T. Clifton Green & Stephen Figlewski, *Market Risk and Model Risk for a Financial Institution Writing Options*, 54 J. FIN. 1465, 1467 (1999); see also Henrik J. Neuhaus, *A Portfolio Approach to Risk Reduction in Discretely Rebalanced Option Hedges*, 44 MGMT. SCI. 921 (1998).

D. FINANCIAL MARKET RESPONSE: THE RISE OF
UNPRICED DEFAULT RISK

As discussed above, to maintain fungibility, liquid markets do not identify counterparty-specific information. As a result, there is no way for an investor to know whether a particular counterparty is a hedging investor, speculator, or liquidity provider, and thus, no way to either seek out the optimal risk-minimizing counterparty or price counterparty risk into a derivative contract. Consequently, it is impossible for any one investor on a liquid market to avoid incurring counterparty default risk.⁵⁹

Even if it were possible to obtain counterparty specific information, however, it would not be possible to use *differentiating* price on the derivative markets due to the fungibility of derivatives on a liquid exchange. Rather, any such cost would have to be capitalized into all of the contracts traded on the exchange. This solution, however, is not available to liquid derivative markets either. If pricing was used in this manner, marginal hedging investors would be priced out of the market; to maintain liquidity, therefore, additional speculators would be necessary to fill the void. The resulting increase of higher-risk speculators and decrease of lower-risk hedgers would increase the overall default risk in the market, requiring another increase in the price to reflect this risk, which would lead to an unsustainable pricing spiral.⁶⁰ Consequently, price *cannot* be used on a liquid exchange to take into account the differing default risk of counterparties.⁶¹ The primary consequence of risk decoupling and liquidity providers, therefore, is that investors in such markets must accept the chance of bearing some unpriced default risk (depending on the counterparty) in exchange for the low transaction costs provided by the liquid markets.⁶²

59. To the extent an investor acquires a derivative with a liquidity provider hedge fund as a counterparty, such default risk is determined by the ability of the hedge fund to dynamically hedge their derivative positions. Dynamic hedging is subject to both model failure and liquidity constraints, each of which is outside of the knowledge or control of the investor. See Cooper & Mello, *supra* note 26, at 599.

60. See Mozumdar, *supra* note 33, at 222 (“Attempting to compensate the swap dealer for the default risk of speculative swaps by raising the cost of swapping to the counterparty would only exacerbate the speculative intent of the pool of counterparties, thereby further increasing default risk and leading to a breakdown in the swap market.”). Perhaps even more perversely, marginal hedging investors could be converted into rational speculators due solely to this increase in cost in the derivative position, since the increased cost could exceed the threshold for rational speculation for marginal investors. See *id.*

61. See *id.* Instead of using price differentiation, liquid markets exclude counterparties from participation in the liquid market based on their credit rating. Since no investor can tell if a particular counterparty is a hedging investor or a speculator, the market uses credit rating as a proxy for the equity holder’s vega. See *id.* at 234 (“[D]ealers have to rely upon the observed counterparty credit rating . . . to infer the swapping motive[, but] it is impossible to precisely distinguish between hedgers and non-hedgers on this basis due to the noisiness of observed credit quality. . .”).

62. See Cooper & Mello, *supra* note 26, at 598-99 (“There are two types of risk in swap transactions: rate risk, and default risk. . . [D]efault risk . . . is much more difficult to hedge.”). Further, and perhaps more troubling, such default risk can almost never be diversified away simply by entering into additional derivatives with hedge funds. For example, under at least one study it was determined that, since potential defaults could be

In response to this problem, modern liquid derivatives markets adopted the use of intermediaries such as clearinghouses, not to reduce transaction costs (which are minimized by the liquidity of the market), but to ameliorate the effects of this structural counterparty default risk problem. Clearinghouses do so by pooling default risk, such that the risk of default for any one derivative investor is not that their specific counterparty will default but rather that the default would exceed the collective resources of the clearinghouse. As a result, an investor seeking to acquire a financial derivative on a liquid market would place the order with the clearinghouse, which then separately executes the order with a counterparty.⁶³

Clearinghouses operate to mitigate risk primarily through three mechanisms: (1) margin, (2) mark-to-market, and (3) netting.⁶⁴ First, the clearinghouse requires investors to post margin with the clearinghouse prior to investing in a derivative, which serves as security on the embedded contingent liability in the derivative position. Second, the clearinghouse marks the derivative contract to market on a daily basis based on the trading price on the liquid market. Daily marking to market combined with daily margin account adjustments serve to prevent the counterparty default risk from increasing unabated as the embedded liability in the derivative increases on an unrealized basis.⁶⁵ Third, the clearinghouse nets all positions held by a particular counterparty. Netting effectively serves as an additional form of margin, preventing counterparties from realizing on their winning bets while defaulting on their losing bets.⁶⁶

extreme, the ability to diversify default risk through investment in multiple hedge funds was severely limited. See Corentin Christory, Stéphane Daul & Jean-René Giraud, *Quantification of Hedge Fund Default Risk*, 9 J. ALTERNATIVE INVESTMENTS 71, 83 (2006) (“[T]he extreme operational risk of hedge funds is a risk that is difficult to diversify . . .”).

63. With respect at least to listed futures, a second intermediary plays an important role in the liquid derivative markets: the Introducing Broker or Futures Commission Merchant (collectively, FCMs). The FCM serves as the intermediary between the individual investors and the clearinghouse. In effect, the FCMs are the members of the clearinghouse, and it is the positions of the FCMs that are subject to margin, mark-to-market, and netting at the clearinghouse. The FCMs collect margin from their individual customers to post the combined margin for the clearinghouse. The FCMs thus effectively serve a smaller risk-pooling function, pooling the risks of their clients among themselves in addition to relying upon the credit of the clearinghouse to support the counterparty risk of the liquid market as a whole. Due in part to this function, FCMs have been subject to enhanced scrutiny, including registration with the CFTC since the adoption of the Commodity Futures Modernization Act of 2000. See Commodity Futures Modernization Act of 2000, Pub. L. No. 106-554, 114 Stat. 2763 (2000); see also David B. Esau, Comment, *Joint Regulation of Single Stock Futures: Cause or Result of Regulatory Arbitrage and Interagency Turf Wars?*, 51 CATH. U. L. REV. 917, 929-32 (2002).

64. See, e.g., Jerry W. Markham, “Confederate Bonds,” “General Custer,” and the Regulation of Derivative Instruments, 25 SETON HALL L. REV. 1, 61-68 (1994).

65. See *id.* at 68 (“The posting of margin on positions marked-to-market daily provides a very reliable method for assuring appropriate risk recognition. Clearinghouses will reduce counterparty risk for both dealers and end users.”).

66. See *id.* at 66 (“Netting simply involves the offsetting of similar contracts with a counterparty. . . . [T]here is some economic reduction of risk in netting that should be recognized.”).

Through these mechanisms, the clearinghouse serves as a form of self-insurance, spreading the risk of any one counterparty default among all of the members of the clearinghouse.⁶⁷ As with any form of insurance, however, if the clearinghouse miscalculates risk or premiums, then *all* investors would be subject to the risk of default by any *one* investor, if the default amount exceeded the total pooled assets of the clearinghouse.⁶⁸ As long as individual counterparties were sufficiently small or traded in traditional assets, the likelihood of a clearinghouse miscalculating default risk to such an extent that could potentially bankrupt the exchange was minimal. The introduction of modern financial speculators acting as liquidity providers fundamentally changed this, however, since the business model of liquidity providers was precisely to consolidate and magnify risk through increasingly complicated financial instruments. The problem is that there is no way for clearinghouses to know the specific default risk of a particular speculator, and thus set the margin accounts, with any degree of certainty.⁶⁹

This problem is exacerbated in the case of liquidity providers because one of the most significant sources of their collateral tends to be illiquid hedging positions.⁷⁰ The valuation of such positions by the clearinghouse, although crucial to calculating margin, proves difficult precisely because the liquidity provider's method of valuation for these instruments relies on their proprietary trading models, which are opaque at best,⁷¹ and which they tend to overvalue in their self-reported disclo-

67. See, e.g., Jonathan H. Rushdoony, *Risk Management of Financial Derivatives*, in 935 PLI/CORP 9, 33 (1996).

68. This should only be the case to the extent the clearinghouse miscalculates default risk (and thus margin requirements) of its customers, which is not purely theoretical because it did in fact occur. In 1985, as a result of an unexpected price shock that significantly reduced their net futures position, certain large customers of Volume Investors (a FCM) defaulted on their futures obligations based on the daily mark-to-market price and the resulting margin call. In response, the clearinghouse immediately seized the entire amount of Volume's margin, including that posted by non-defaulting customers. As a result, the non-defaulting customers were themselves in default, since they could not meet the margin requirement with respect to their positions. See James V. Jordan & George Emir Morgan, *Default Risk in Futures Markets: The Customer-Broker Relationship*, 45 J. FIN. 909, 910 (1990). The Clearinghouse did eventually agree to make the non-defaulting investors whole due to reputational concerns and industry pressure. See David Bates & Roger Craine, *Valuing the Futures Market Clearinghouse's Default Exposure During the 1987 Crash*, 31 J. MONEY, CREDIT, & BANKING 248, 249 (1999); see also Roberta Romano, *A Thumbnail Sketch of Derivative Securities and Their Regulation*, 55 MD. L. REV. 1, 21 n.46 (1996).

69. See, e.g., Hu, *supra* note 15, at 1468-69 ("In sum then, the buyer of the option is subject to a credit risk equal to the market value of the option, but, unless one knows the future, it appears impossible to quantify the 'time value,' and hence, the market value of the option.").

70. The method adopted by the industry, "counterparty credit risk management" (CCRM), does not perfectly measure counterparty risk, although it may be the best option available. See John Kambhu et al., *Hedge Funds, Financial Intermediation, and Systemic Risk*, FRBNY ECON. POL. REV., Dec. 2007, at 1-2, <http://www.newyorkfed.org/research/ep/07v13n3/0712kamb.pdf>.

71. See e.g., IMF HEDGE FUND REPORT, *supra* note 8, at 54 ("[M]any hedge funds avoid allowing any counterparty to obtain full transparency to its trading and investment strategies, based largely on a desire to protect proprietary information. . .").

tures.⁷² As a result, a speculator may fully comply with margin requirements, and thus appear riskless, but yet be under-collateralized.⁷³ Due to these problems, modern clearinghouses face an increasingly impracticable choice—to either price the unpriceable or lose the liquidity necessary to maintain the exchange.⁷⁴

Consequently, no clearinghouse is able to perfectly assess the risk exposure of a liquidity provider, and thus the market can become unintentionally over-exposed to default risk.⁷⁵ One possible solution, to raise the price of the derivatives, is not available to the clearinghouse due to the price spiraling problem.⁷⁶ Another solution, to require more collateral as default risk rises, could cause more harm than good by resulting in margin calls precisely when counterparties are at their most vulnerable.⁷⁷

72. See Nicolas P. B. Bollen & Veronika K. Pool, *Do Hedge Fund Managers Misreport Returns? Evidence from the Pooled Distribution* 28-29 (Vanderbilt University, Working Paper, 2007), available at <http://ssrn.com/abstract=1018663>.

73. For example, the most commonly used risk metric (“Value at Risk” or “VAR”) has been found to significantly understate a hedge fund’s risk of loss in a negative market. See, e.g., Vikas Agarwal & Narayan Y. Naik, *Risks and Portfolio Decisions Involving Hedge Funds*, 17 REV. FIN. STUD. 63, 86 (2004); Arthur E. Wilmarth, Jr., *The Transformation of the U.S. Financial Services Industry, 1975-2000: Competition, Consolidation, and Increased Risks*, 2002 U. ILL. L. REV. 215, 345-46. In addition, hedge funds often enter into derivatives directly or indirectly with other hedge funds, further multiplying this distortion. See, e.g., Kambhu et al., *supra* note 70, at 11-12.

74. See Kambhu et al., *supra* note 70 at 1 (“Effective CCRM is obviously needed for any counterparty, but hedge funds differ in important ways such as their use of complex trading strategies and instruments, leverage, opacity, and convex compensation structures, all of which increase the challenges to effective CCRM.”).

75. See *id.*; see also Hu, *supra* note 15, at 1480 (“In the early days of the swap market some institutions did not even recognize swaps as having any credit risk at all. Today, there is concern that some dealers do not understand the full risks associated with . . . derivatives.”) (internal footnotes omitted); Randall S. Kroszner, *Can the Financial Markets Privately Regulate Risk?: The Development of Derivatives Clearinghouses and Recent Over-the-Counter Innovations*, 31 J. MONEY, CREDIT & BANKING 596, 600-04 (1999).

76. In fact, price increases to reflect default risk have not been generally adopted by the markets. See Bomfim, *supra* note 57, at 32-33.

[D]ealers by and large do not adjust their posted rates in response to changes in counterparty credit risk. . . . [T]he finding of no statistically significant role for counterparty credit risk in the determination of market swap rates should not be taken to mean that financial market participants and regulators can simply think of swaps as riskless contracts and ignore the potential for default-related losses in swap books. After all, it is the very existence of working procedures for mitigating counterparty risk that is presumably partly responsible for the lack of sensitivity of swap rates to common proxies for counterparty credit risk.

Id.

77. See Henny Sender, *Insuring Against Credit Risk Can Carry Risks of Its Own*, WALL ST. J., Aug. 6, 2007, at C1.

Feeding worries about problems in the credit-derivatives market is the lack of transparency and precise data. . . . The prudent thing for any single bank to do when times are tough is to demand more collateral and margin from hedge-fund clients. But as the banks force hedge funds to put up more of their own capital, they could trigger additional losses, adding more volatility to financial markets.

Id. Further, even if clearinghouses wanted to require more collateral (or were forced to do it through regulation), such an approach could lead to a downward spiral by converting counterparties into gambling speculators just to cover their losses, further increasing default risk imposed on the system as a whole. See *supra* notes 34-35 and accompanying text.

Consequently, some default risk remains unpriced in the market.

Ironically, it is precisely the mechanisms intended to protect the market from this default risk, that is, margin, netting, and mark-to-market, which make the presence of single large counterparties, such as liquidity providers, so significant.⁷⁸ Assuming a liquidity provider were to face a shock in the worldwide economy (such as the 1987 stock market crash or the 1998 Asian currency crisis and Russian debt default), three potential consequences could arise that would be problematic for the liquid derivatives market. First, in response to an increase in the liability position of the derivative contracts of the liquidity provider, the liquidity provider would be forced to sell low liquidity assets to meet the margin requirement on its derivatives. This would result in a “funnel” effect, a sharp and dramatic decrease on the price of the assets, further hurting the financial health of the speculator and leading to a downward price spiral in the market.⁷⁹ Second, a “knock-on” effect could occur, causing other holders of the actual risky asset to suffer significant and unexpected losses, severely impairing their credit, and thus negatively impacting the creditors of these investors.⁸⁰ Third, the mass liquidation of positions by the liquidity provider could lead to a “chain reaction” for derivative counterparties, which were relying on the derivatives to meet their own margin requirements.⁸¹ Such a chain reaction would require the investors to either meet margin with additional funds or liquidate their own positions, further resulting in downward pressure on the price of the underlying asset and threatening the creditworthiness of the counterparty.⁸²

The combination of these three effects has been demonstrated by the modern “credit crunch” and the subsequent liquidity freeze. The collapse of some of Wall Street’s most storied names can be thought of as attributed partly to the combination of the funnel, knock-on, and chain reaction effects, resulting in the inability of such institutions to sell their mortgage-based financial assets. The story of such collapses is not necessarily that these institutions did not have assets to satisfy their debts, but rather that they did not have the *liquidity* to convert their offsetting bets into covering positions.⁸³ This led to a call on their assets by existing

78. See, e.g., PRESIDENT’S WORKING GROUP REPORT, *supra* note 8, at 23; see also Steven L. Schwarcz, *Systemic Risk*, 97 GEO. L.J. 193, 241-42 (2008).

79. The funnel effect is similar to a traditional “short squeeze” effect, but in the opposite direction. See, e.g., Franklin R. Edwards, *Hedge Funds and the Collapse of Long-Term Capital Management*, 13 J. ECON. PERSPECTIVES 189, 202 (1999) (discussing the funnel, knock-on, and chain reaction effects).

80. See *id.*

81. See *id.*

82. See, e.g., IMF HEDGE FUND REPORT, *supra* note 8, at 50 (“[R]equirements for collateral and other credit terms may . . . force hedge funds to liquidate positions at the worst time, and possibly exacerbate deteriorating market conditions and weaken the counterparty’s position.”).

83. See, e.g., Louis Story, *Citadel Chief Denies Rumors of Trouble*, N.Y. TIMES, Oct. 25, 2008, at B1 (“[M]ost of the funds’ losses were mark-to-market losses, which he thought were caused by a lack of liquidity and not by weakened assets. Earlier this year, investment banks said their losses were being caused by similar liquidity problems.”).

creditors, and hesitancy by future creditors to extend additional credit.⁸⁴ As a consequence, once thriving historic financial businesses quickly went bankrupt.⁸⁵ The ultimate result was that the creditors of these speculators, who assumed they were creditworthy, were left holding the bag.⁸⁶

The logical conclusion from the funnel, knock-on, and chain reaction effects, supported by anecdotal evidence from the credit crunch, is that *every* investor in the liquid derivative market bears a portion of the potential default risk of *every* financial speculator acting as a liquidity provider. Assuming that such speculators are necessary actors in a liquid derivatives market, in effect every investor entering into a derivative on a liquid market bears such default risk to some degree, either with respect to any one default in excess of pooled risk protection in the case of a clearinghouse, or with respect to a funnel and/or chain reaction effect in the case of a default by a liquidity provider, or both.⁸⁷ Since single large counterparties magnify this risk, as hedge funds and investment banks increasingly participated in the liquid derivative markets, the risk imposed on the market as a whole intensified, becoming increasingly relevant to areas outside traditional risk management and financial regulation, such as the income tax, as well.

III. TAXATION, RISK, AND MODERN FINANCIAL MARKETS

To understand how, if at all, the introduction of this new default risk may impact an income tax, such risk must be introduced into the taxation and risk model to determine whether such risks would even be subject to taxation under an optimal tax system. At first, approaching risk from the perspective of taxation seems relatively straightforward—since risky assets can generate positive returns, a tax on risk must reduce those returns to the investor and raise revenue for the government. The taxation and risk model challenges this intuition, by establishing that, under a certain set of assumptions, risky returns can in fact escape taxation altogether.⁸⁸

84. See Story & White, *supra* note 2.

Lehman had put down securities it believed were worth \$6 billion during the summer to assuage the bank's concerns that its trades were risky. But JPMorgan thought those securities had deteriorated in value, and asked for \$5 billion in cash or liquid assets on Sept. 4. Over the course of the next week, JPMorgan requested more money from Lehman. . . . By the weekend of Sept. 14-15, most Lehman workers knew the firm's days as an independent bank were over.

Id.

85. See Andrew Ross Sorkin, *Lehman Files for Bankruptcy; Merrill is Sold*, N.Y. TIMES, Sept. 15, 2008, at A1.

86. See Jonathon D. Glater & Gretchen Morgenson, *A Fight for a Piece of What's Left*, N.Y. TIMES, Sept. 16, 2008, at C8 ("A worldwide battle began on Monday over the remains of Lehman Brothers as the biggest bankruptcy filing in history sent creditors scrambling to protect their investments.")

87. See Edwards, *supra* note 79, at 202.

88. This insight has served as the basis for a number of revolutions in the analysis of a normative income tax. See, e.g., Bankman & Griffith, *supra* note 7.

At first glance, the taxation and risk model supports the concept that all risk escapes taxation, assuming the absence of structurally unpriced and non-diversifiable risks. Such an assumption, however, does not take into account the unique nature of default risk on liquid derivatives markets. Taking this into account, the question becomes more complicated—can a facially neutral income tax still cause adverse consequences when risk decoupling is introduced? Based on a number of relatively conservative assumptions, the answer can turn out to be yes.

A. THE TAXATION AND RISK MODEL

Broadly speaking, risky returns are those returns based on the risk of an occurrence; more specifically, risky returns are those based on the probability of an occurrence but not based on uncertainties.⁸⁹ The classic risk-based return is the coin flip. Assuming a fair coin, there is a 50% chance on any coin flip that the coin will come up heads or tails. A bet that the coin will be heads is a pure risk-based bet.⁹⁰ Assuming a \$100 bet and a fair coin, the present value of each bet is \$50, and each party to the coin flip grants a contingent promise worth \$50 for a reciprocal contingent promise worth \$50. Although the present values of the two bets are identical, the two bets are not the same—after all, one will lose and one will win. The bet thus represents both a contingent asset and a contingent liability to each party, in that each party has a 50% chance of being owed money or owing money. In other words, the pure-risk bet embeds a liability into the risk-based position; the only question is the direction of the liability.

What is the effect of imposing an income tax on a pure-risk bet? Assuming the government imposes a 50% tax, all gains and losses are taxed on a mark-to-market basis, losses are fully refundable, and the system is closed, for every \$100 bet made, each party would only win or lose \$50 after taxes: the winner would win \$100 and owe \$50 to the government, the loser would lose \$100 and be paid \$50 by the government for the loss, and the government would be revenue neutral since the \$50 of tax collected from the winner would be paid to the loser.

The crucial insight provided by Professors Evsey Domar and Richard Musgrave is that taxpayers should be wholly indifferent to taxes on pure-risk bets.⁹¹ At first glance this seems counterintuitive, since the winner of the bet will have received \$50, rather than the original \$100, due solely to

89. See, e.g., Lynn A. Stout, *Why the Law Hates Speculators: Regulation and Private Ordering in the Market for OTC Derivatives*, 48 DUKE L.J. 701, 743 (1999); see generally Anthony B. Atkinson & Joseph E. Stiglitz, *Taxation and Risk-Taking*, in LECTURES ON PUBLIC ECONOMICS 97 (1980).

90. There is no time-value component of the bet because no cash is invested up-front to make the bet. Instead, the two parties to the bet exchange contingent risk-based bets with identical present values; in this case, one person bets on heads and one person bets on tails. See *supra* note 23 and accompanying text.

91. See Evsey D. Domar & Richard A. Musgrave, *Proportional Income Taxation and Risk-Taking*, 58 Q. J. ECON. 388, 390 (1944).

the imposition of the tax. The solution described by Domar and Musgrave provides that the parties to a pure-risk bet should simply increase the size of their bet to offset the tax rate.⁹² Thus, in the example above, the parties could simply double the nominal size of their bet to \$200.⁹³ In such case, the winner would receive \$200 and pay \$100 to the government in taxes, while the loser would pay \$200 to the winner but receive \$100 from the government. The net effect would be for the parties to win or lose a net of \$100, precisely the result the taxpayers preferred in the no-tax world.⁹⁴

Similarly, an income tax nominally taxes gains derived from capital investments.⁹⁵ For example, if a taxpayer were to make an investment in a share of stock for \$1,000 and the price of the stock rose to \$2,000, at which time the taxpayer sold the stock for cash, the taxpayer would have \$1,000 of taxable gain.⁹⁶ Notwithstanding the relatively straightforward nature of this investment and its nominal taxation, the income taxation and risk literature challenges whether such gains are truly subject to tax.⁹⁷ It does so by deconstructing returns from capital investments into (1) time-value returns and (2) risk-based returns.⁹⁸

It is relatively straightforward to see why this is the case. In the example above, the taxpayer invested \$1,000 in stock, which means the taxpayer did not invest in a risk-free asset such as Treasury securities. To the extent that the risk-free rate is greater than zero, a rational taxpayer would not have invested in the stock unless it provided at least the risk-free rate of return.⁹⁹ Assuming the risk-free rate is 4%, why did the taxpayer invest in a stock that does not pay at least a guaranteed \$40? The answer provided by the theory is that the stock does in fact pay the \$40 risk-free return, but “embeds” the return into the overall return on the stock.¹⁰⁰

92. *See id.*; *see also* Noël B. Cunningham, *The Taxation of Capital Income and the Choice of Tax Base*, 52 *TAX L. REV.* 17, 31 (1996) (“[I]f an investor were willing to invest \$1,000 in a risky venture in a world without taxes, she should be willing to invest \$1,000/ (1-t) in that venture in a world with a normative proportional income tax.”).

93. $\$100/(1-.5)=\200 .

94. *See, e.g.*, Weisbach, *supra* note 4, at 2. What becomes clear upon considering the Domar-Musgrave theorem is that it relies on the ability of taxpayers to scale-up risky investments without transaction costs. Any transaction costs act as a net cost to the parties engaging in the risky bet solely to mitigate the effect of the taxes. *See, e.g.*, Cunningham, *supra* note 92, at 39-43. Derivatives serve to reduce these transaction costs and thus become a relevant point of analysis in the model. *See* Schizer, *supra* note 17, at 1904.

95. *See* 26 U.S.C. § 61 (2000).

96. *See* 26 U.S.C. §§ 61, 1001 (2000).

97. *See* Weisbach, *supra* note 4, at 2.

98. *See id.* at 12-21. In addition, investments have a third component: inframarginal returns. Inframarginal returns refer to returns in excess of the sum of the risk-free rate of return plus the risky return. This is possible due to the skill and effort of the officers or employees. For purposes of this Article, it is sufficient to focus only on risk and risk-free returns, since the treatment of inframarginal returns are unaffected under the taxation and risk model. *See id.* at 19-21.

99. *See id.*

100. *See id.* at 13-14.

Since the investment returns the risk-free rate of return, a risk-neutral investor would purchase any investment where the risk-adjusted present value of the risky portion of the stock was zero, such as in the coin flip. For example, a risk-neutral investor should be indifferent between investing \$1 or \$1,000,000 in an investment that pays the risk-free rate of return plus has a 50% chance of doubling the investment or a 50% chance of losing the entire investment. This also does not reflect the real world, however, because investors are not risk-neutral but rather demand compensation for bearing risk. Thus, in the above example, the investor would demand a greater return, for example, something like winning \$120 if the bet wins, while only losing \$100 if the bet loses, before being willing to make the investment.

As a result, a single investment in a share of stock could be thought of as representing an investment in both the risk-free rate of return plus a premium for bearing risk.¹⁰¹ Isolating out the risk-free rate of return leaves only the risky return of the stock, similar to the results of a coin flip.¹⁰² Unlike a coin flip, however, the risky return embedded in stock is not a zero-sum game, where for every winner there must be a loser. Rather, the "risk" at issue may be the systemic risk of the economy as a whole, a risk particular to the industry in which the company operates (such as commodities, air travel, technology, etc.), interest-rate risk, legal risk or idiosyncratic risk of the particular company at issue, or portfolio allocation risk of the particular investor.¹⁰³ Regardless, to the extent that any return on stock is purely risk-based, it is similar to that of a coin flip in the hands of the investor.¹⁰⁴

Under Domar-Musgrave, the investor should be indifferent as to the tax on this risky portion of the stock investment, since the investor could simply increase the bet to mitigate the effects of the tax.¹⁰⁵ For example, assuming an investor buys a share of stock for \$100, there are no borrowing constraints, and that the investor borrows at the risk-free rate, the

101. See, e.g., Samuel C. Thompson, Jr., *Demystifying the Use of Beta in the Determination of the Cost of Capital and an Illustration of Its Use in Lazard's Valuation of Conrail*, 25 J. CORP. L. 241, 244-46 (2000).

102. See *id.*

103. See, e.g., Anthony B. Atkinson & Joseph E. Stiglitz, *Taxation and Risk-Taking*, in LECTURES ON PUBLIC ECONOMICS 97, 103-04 (1980).

Whether a particular asset is risky or not depends not only on the individual's consumption plan, but also on what other assets are available to him. For instance, if the individual holds a large portfolio of equities, and if long-term bonds are negatively correlated with equities, . . . he may be willing to hold long-term bonds even if the expected return were lower than the safe rate of interest.

Id.

104. For example, if an investor owned stock in an electric utility, the return on the stock could be affected by a particularly hot summer in the area served by the utility, since a cool summer would mean a lower return due to less electricity being used. In this case, the summer heat would comprise a risk-based return on the stock. There are a number of other risk-based returns that could be embedded in the stock of an electric utility, such as the cost of coal or oil, the cost of labor, or the risk of increased regulatory oversight.

105. See Domar & Musgrave, *supra* note 91, at 390.

investor could simply borrow an additional \$100 and purchase a second share of stock to mitigate the tax on the risky portion of the stock. Due to the nature of the capital investment, the investor would have incurred a cost equal to the risk-free rate (since the investor borrowed capital to double the bet), but also would have doubled the risk-free return on the investment. Since these offset, the net effect to the investor would be that only the original risk-free rate of return would be subject to the tax.¹⁰⁶

Domar-Musgrave represents a partial equilibrium model of the income taxation of risk in that it looks at the effects on the taxpayer of mitigating the income tax through multiplying investments in risky assets.¹⁰⁷ With respect to the government, by imposing a 50% income tax on risky investments, the government effectively bears 50% of the risk—if the taxpayer wins the bet, the government will reap half of the benefit, while if the taxpayer loses the bet, the government bears half of the loss.

In effect, the imposition of the tax on the risky portion of a stock investment serves to make the government and the taxpayer partners in the risky investment.¹⁰⁸ Assuming all parties are in an optimal equilibrium pre-tax, compared to a no-tax world the government would be in a sub-optimal position in that it has now taken on a net risk in excess of its preferred risk exposure.¹⁰⁹ For the government to return to its preferred risk position, it would have to offset this risk exposure.¹¹⁰ The government can mitigate such risk by selling it “short” in the market.¹¹¹ In the classic short sale, an investor borrows a share of stock and sells the stock in the market at its fair market value.¹¹² At maturity, the investor is obligated to return one share of stock regardless of its market value.¹¹³ If the value of the stock declines, the short seller will profit, since it will require less money to return the one share of stock than the investor received when it borrowed the stock and sold it initially.¹¹⁴

In the general equilibrium model, the government sells its risk back into the market by shorting the risky investment.¹¹⁵ As a result, as the demand for the risky investment increases in light of the imposition of the income tax, the supply similarly increases due to the short sale by the government.¹¹⁶ These two offset each other, such that the total supply and demand for the risky asset remains unchanged, and thus the price for

106. See Appendix for a numerical description.

107. See, e.g., Daniel N. Shaviro, *Replacing the Income Tax with a Progressive Consumption Tax*, 103 TAX NOTES 91, 93-105 (2004).

108. For a detailed discussion of a similar concept, see Hanna, *supra* note 4, at 388-91.

109. See generally Louis Kaplow, *Taxation and Risk Taking: A General Equilibrium Perspective*, 67 NAT'L TAX J. 789 (1994).

110. See *id.*

111. See, e.g., Weisbach, *supra* note 4, at 12.

112. See, e.g., Yoram Keinan, *United States Federal Taxation of Derivatives: One Way or Many?*, 61 TAX LAW. 81, 135-36 (2007).

113. See *id.*

114. See *id.*

115. See Kaplow, *supra* note 109.

116. See *id.*

the risky asset remains unchanged.¹¹⁷ Similarly, the government receives cash from selling the investment short, but also loans cash to the taxpayer to make the risky investment.¹¹⁸ These loans and borrowings also will offset, such that money supply and interest rates also remain unchanged.¹¹⁹ Thus, even looking at all actors in the general equilibrium model, the imposition of an income tax on risky assets can result in only the taxation of the risk-free return on the initial risky investment, with no other impact on the taxpayer, the government, or the market.¹²⁰ Under this general equilibrium analysis, the application of Domar-Musgrave fully mitigates all impacts of the imposition of the tax, other than on the initial risk-free return, because the investor and the government appropriately made adjustments to the investment in the *identical* risky asset, through the use of circular transactions.

Of course, as with all models, the general equilibrium model relies on a number of assumptions that have been subject to criticism. For example, one assumption is that the government “rebalances” its risk portfolio by selling the investment back into the market.¹²¹ What is required to make this assumption is that the increased demand by the taxpayer for the risky investment, due to portfolio adjustments, will lead to an increase in market price for the investment (that is, a “market signal”) and that the government, as a rational actor, in light of the increase in market price will sell the risky investment short into the market in response.¹²² This assumption, that both taxpayers and the government will make appropriate portfolio adjustments, has been the subject to significant criticism but has also been defended.¹²³ Solely for purposes of incorporating the taxation of derivatives and liquidity providers into the general equilibrium model in Part III, it is sufficient to rely on this assumption as correct.¹²⁴ Once

117. In effect, the circular cash flow of the long position entered into by the taxpayer and the short position entered into by the government fully offset with respect to the risk-free rate of return. The identical offsetting result will always occur with respect to the mitigating position under a general equilibrium analysis (although the distributional consequences may differ). See Schizer, *supra* note 17. As a result, it is sufficient to focus only on the risky returns and ignore the risk-free return when analyzing such transactions.

118. *See id.*

119. *See id.*

120. See Kaplow, *supra* note 109. See Appendix for a numerical description.

121. See, e.g., Weisbach, *supra* note 4, at 52.

The taxation-and-risk models require the government to adjust its portfolio by selling securities and investing in risk-free assets. Absent this adjustment, markets may not clear at existing prices, which means individuals may not be able to make the required portfolio adjustments. In addition, the pattern of tax revenues will vary depending on the tax system chosen, which defeats the equivalences.

Id.

122. In effect, the model assumes that the government knows that the imposition of the income tax that disturbed the price equilibrium, meaning that the government is bearing undue risk as a result. *See id.*

123. See, e.g., Zelenak, *supra* note 7, at 895-96; Weisbach, *supra* note 4, at 52-56.

124. This is for two reasons: (1) this Article is attempting to introduce the taxation of hedge funds into the general equilibrium model, and thus will use the same assumptions as a starting point; and (2) only those assumptions that must be relaxed to introduce derivatives into the model will be modified.

the model is extrapolated in Part IV, this assumption will be relaxed and the implications for extending the lessons of the model to the real world will be more closely examined.

Another assumption in the taxation and risk model is that the taxpayer can borrow at the risk-free rate to rebalance.¹²⁵ In reality, however, taxpayers cannot borrow at the risk-free rate, but rather must borrow at higher rates to compensate for the risk that the taxpayer may not be able to repay.¹²⁶ This increased borrowing rate effectively acts as a net cost to the taxpayer, incurred solely to mitigate the effects of the income tax under Domar-Musgrave; it can be thought of as a form of regressive tax (in that the cost of capital is generally higher for taxpayers with lower income) on the rebalancing of risk in light of the imposition of an income tax.¹²⁷

Broadening this insight to the general equilibrium, even if the taxpayer defaults on the loan, the taxation of risk remains fully mitigated since the taxpayer increased the bet on the underlying risky investment, while the lender fully priced the default risk into the loan itself. Since the increased demand for liquidity would increase the cost of capital generally, in response the government could lend into the market to return the system to equilibrium. Thus, the problem turns out to be solely a distributional and incidence one, not a failure of the government to return to the pre-tax equilibrium.¹²⁸

This borrowing constraint, and the regressive distributional consequences arising as a result, has served as the basis of criticism for both the income tax and the taxation and risk model more generally.¹²⁹ One response to this criticism has been that the development of liquid derivative markets serves to mitigate this problem, since derivatives provide cheaper ways for taxpayers to increase their bets on risky investments than loans under the Domar-Musgrave theorem.¹³⁰ Assuming this is cor-

125. See Cunningham, *supra* note 92, at 37.

126. See *id.* For example, rather than pay four percent interest, the taxpayer may be required to pay six percent on the borrowed funds due to the chance that he may default on the loan. Assuming the government was risk-neutral, one way to think of this would be that the government, in making the loan to the taxpayer, has itself made a risky investment that can be deconstructed into a risk-free return of four percent plus a risky return composed of a chance of receiving an additional two percent or a chance of losing four percent. See *id.*

127. See *id.* at 39-43. The government is indifferent to the net cost to the taxpayer under general equilibrium, because the value of the interest deduction to the taxpayer will be exactly offset by the taxes on the interest income by the lender. See Appendix for a numeric example.

128. See Cunningham, *supra* note 92; Weisbach, *supra* note 4, at 52-56. This may be sufficient from a normative perspective to make changes to the income tax base, but it does not implicate the equilibrium in the model. See Weisbach, *supra* note 4, at 52-56.

129. See Cunningham, *supra* note 92.

130. See Weisbach, *supra* note 4, at 16 n.23.

[I]f derivative markets in the risk in question exist, the individual need not borrow and buy an investment. Instead, he can eliminate the tax on risk merely by increasing his bet through a derivative. This makes the investment case look exactly like the coin flip. In addition, the borrowing rate becomes irrelevant. . . .

rect, the model would result in an increase in demand for derivative instruments linked to risky assets. The remainder of Part III will analyze this proposition by incorporating the increased demand for derivative instruments in response to the imposition of an income tax, and the role liquidity providers play in supplying this demand, into the income taxation and risk model.

B. RISK DECOUPLING AND THE MARKET SIGNAL MALFUNCTION

The taxation of derivative investments, standing alone in the Domar-Musgrave model, has been addressed in the literature and has produced some intriguing results. The primary lessons of looking at derivatives under this model are: (1) derivatives provide a cheaper way for taxpayers to multiply bets on risky investments and thus make Domar-Musgrave more feasible even in a world with transaction costs and borrowing costs; and (2) since derivatives, just like a coin flip, are "pure risk" zero-sum bets, the government can be indifferent as to the tax treatment of them so long as the "winning" positions and the "losing" positions on any particular type of derivative investment are treated roughly equally.¹³¹ Incorporating these lessons into a general equilibrium model of taxation of risk, assuming that taxpayers use derivatives to mitigate tax on underlying risky assets, leads to some surprising conclusions.

Because derivatives would not exist in an efficient market with rational actors and no transaction costs, to introduce derivatives into the taxation and risk model, two assumptions in the model must be relaxed: (1) there must be transaction costs in finding and purchasing risky investments, and (2) not all taxpayers can borrow at the risk-free rate.¹³² After relaxing these two assumptions, derivatives become relevant in the model since they serve to reduce both transaction costs and borrowing costs. As a corollary, derivative counterparties must be introduced into the model, since derivatives cannot exist absent counterparties,¹³³ and correspondingly default risk must be introduced as well.

To analyze the extent to which investors can use derivatives as a way to minimize the impact of the taxation of risky returns under the general equilibrium model, it is necessary to look not only to the treatment of the taxpayer and the counterparty, but also to the government and the market price for the underlying risky investment. Assuming that the derivative serves solely as a means to reduce transaction costs but not change the cash flows, the general equilibrium model holds relatively easily since

Id.

131. More specifically, so long as risk-adjusted present value of tax benefits and tax costs offset (or the "gain/loss ratio" is one), the government is indifferent as to the tax treatment of a particular asset. See Schizer, *supra* note 17, at 1891 ("This Article . . . emphasizes a context in which scaling up is relatively cheap: derivatives.").

132. This is because derivatives exist to reduce the transaction costs of engaging in such transactions, as it is much simpler to enter into a derivative than attempt to replicate the derivative with underlying assets. See *supra* note 28 and accompanying text.

133. See *supra* note 17 and accompanying text.

the cash flows would be identical to those in the general equilibrium model.¹³⁴ This makes intuitive sense—if the cash flows are identical, then the form of the cash flows should be irrelevant to the systemic equilibrium.

The use of derivatives traded on a liquid market can raise different and unique issues in the general equilibrium model, however, because taxpayers would no longer be holding identical assets to mitigate the tax; rather, a taxpayer would own the original risky asset plus a derivative on the risky asset. Unlike in the general equilibrium analysis described above, due to the use of the derivative it is possible for the market price signal to malfunction, thus disrupting the equilibrium. More specifically, rather than demand for the underlying risky asset increasing in light of the imposition of an income tax, demand for derivatives would increase because derivatives provide a cheaper way for taxpayers to scale than borrowing to buy the underlying assets. As a result, the market signal of increased prices of the underlying asset would not occur, since increase in demand for the asset had not occurred.

What about the increased demand for the derivative? Although counterintuitive, the increased demand for derivatives would increase neither the price of the derivative nor of the asset, due to two unique qualities of the pricing of derivatives: (1) derivatives are priced relative to the price of the underlying asset and not to the supply and demand of the derivative, and (2) trading in the derivative does not directly impact the price of the underlying asset.¹³⁵ Since derivatives are priced with respect to the value of the underlying asset and not based on supply and demand of the derivative itself, an increase in the demand for derivatives linked to a risky asset would not necessarily increase the cost of the asset or the cost of the derivative.¹³⁶ Thus, as taxpayers acquired additional derivatives to mitigate the income tax, the price of both the underlying asset and the derivative would remain unchanged. In other words, the derivatives market would be absorbing the excess demand for the risky asset, such that the increased demand would not be reflected in the markets.¹³⁷

These unique features of derivative pricing can be demonstrated through the example of a coin flip. Assume two people wish to bet on a coin flip and are considering how much to bet. In their discussions, each

134. See Appendix for a numerical description.

135. See *supra* note 38.

136. Whether asset prices do in fact move in relation to derivatives prices will be considered in more detail in Part V. However, to the extent there is not a perfectly linear relationship, some market signal malfunction will occur and the government will bear some risk through the imposition of the income tax.

137. In the real world, it is possible that the price of derivatives may respond to increases in demand, but this would only occur to the extent of transaction costs (since taxpayers could use underlying assets once the cost of a derivative exceeds its transaction costs) and should quickly be arbitrated away by the market. This does not mean that all derivatives price in accordance with Black-Scholes, but rather that whatever the price, it turns on issues other than demand. See Black & Scholes, *supra* note 37, and accompanying text.

person will consider how much they would like to win, how much they would be willing to lose, the odds of the coin landing heads or tails, and the risk that the other person would not pay. In deciding whether to bet \$10 or \$10,000, however, the parties would not care about how much other people would bet on the same coin flip. In other words, that Bill Gates might be willing to risk \$10,000 on a coin flip would not influence whether a law student would risk \$10 or \$20 on the same coin flip. The same point can be seen in a different context—the amount of money that a person living in Boston might be willing to bet on the Red Sox winning the World Series. The Red Sox fan might take into account a number of factors in determining how much to bet,¹³⁸ but whether one hundred, one thousand, or one million other fans in Boston also bet on the Red Sox winning the World Series would not necessarily be one of them.¹³⁹

Without any increase in price serving as an effective market signal that it was bearing risk through the imposition of the income tax, the government, even acting rationally, could not rebalance its portfolio in response. Even accepting the assumptions inherent in Domar-Musgrave, that the government is entirely rational and rebalances its portfolio upon changes in market prices arising due to the imposition of an income tax, the government would not be able to offset its assumed risk when derivatives are involved. As a result, the government would remain in a partnership in the original risky investment with the taxpayer through the imposition of an income tax. Thus, solely because a taxpayer used a derivative rather than the underlying asset to mitigate the imposition of an income tax, the government would effectively bear a sub-optimal amount of risk.¹⁴⁰

In a world where default risk was priced into the contracts, this would not be a concern, since the government could see the increase in default risk in the market as more investors demanded derivatives and thus more risky counterparties entered the market. Since liquid derivatives markets are imperfect in this respect, default risk continues to grow as more and larger liquidity providers enter the market, pooling and magnifying their default risk, but no increase in the price of derivatives on the market occurs. Thus, the government bears an increasing amount of default risk through the imposition of an income tax. This is the heart of the market signal malfunction – that the use of derivatives by taxpayers in a world

138. For example, these could include the health of the players, the desire for bragging rights over the other bettor, the ability of the manager of the baseball club, and potential personal distractions for particular players, among others.

139. This is the case for bilateral bets, but not for bets against a single counterparty such as a casino sports book. In a casino sports book, the house does change odds based on how many people bet on one team or the other, solely to attract more people to bet, since the casino makes money based on the number of bets placed, not the winner of the game. Similarly, this would not be the case in pari-mutuel bets such as horse racing (where the bets are pooled and used to pay off winners), where odds are constantly fluctuating based on the amount of bets placed so as to maximize the available pool of money. For a discussion of the efficiency of pari-mutuel betting, see generally Richard H. Thaler & William T. Ziemba, *Anomalies: Pari-mutuel Betting Markets: Racetracks and Lotteries*, 2 J. ECON. PERSP. 161 (1988).

140. See Appendix for a numerical example.

with an income tax can cause the government to bear a greater amount of risk than it would either in a world where the taxpayer utilized underlying assets to mitigate the tax or one absent income taxes.

C. RISK DECOUPLING AND THE DISTRIBUTIONAL MALFUNCTION

Due to the market signal malfunction, the government may bear some default risk through the imposition of an income tax in a world with financial derivatives. In addition, the risk that the counterparty may default also changes the analysis under the general equilibrium model because, to the extent a taxpayer entered into a derivative on a liquid derivative market, the cash flows are no longer identical to the general equilibrium model. Unlike in the general equilibrium model, when a taxpayer invests in a derivative to mitigate the effect of an income tax, the taxpayer no longer holds two identical risky investments; rather the taxpayer owns the original risky asset and a derivative on the risky asset that also bears some risk that the counterparty will default. It therefore becomes necessary to introduce the investment profile of the counterparty into the analysis.¹⁴¹ This is relevant precisely because the increase in demand for derivative investments, caused by the imposition of an income tax, would lead to an increase in speculative counterparties in the derivatives market, since speculators are necessary to provide the liquidity required to absorb this increased demand.¹⁴²

Assume a taxpayer owns a risky investment and the government imposes a 50% tax. Due to transaction costs, the taxpayer enters into a derivative to increase the risky investment and thus mitigate the tax under Domar-Musgrave by placing an order on a liquid market, and the market-maker places the order with a speculator as the counterparty. Assuming the risky asset wins, the taxpayer earns a positive return on the underlying asset and is owed money on the derivative contract; rather than pay, however, the speculator counterparty defaults on the derivative. As a result, the taxpayer *ex post* earned only the single risky return, notwithstanding that the taxpayer had nominally increased the bet pursuant to Domar-Musgrave *ex ante*. Since the taxpayer did not in fact increase the return on the risky asset, the risky return on the original investment still bears a real income tax liability. By contrast, if the risky asset loses, the taxpayer will owe a liability on the derivative. Assuming the taxpayer pays, the speculator makes a profit. This is the heart of the distributional malfunction – that increased demand for derivatives caused by the imposition of an income tax leads to an increase in the chance of entering into a derivative with a party who will default.

Returning to the coin flip example, this malfunction becomes more apparent. Assume a taxpayer enters into a coin flip with a solvent

141. For example, since hedging counterparties have very different business models from liquidity providers, the impact on the cash flows in the general equilibrium model will differ as well. See *supra* notes 33-35 and accompanying text.

142. See Krawiec, *supra* note 15, at 15.

counterparty for \$100, and the government imposes a 50% tax. The taxpayer wants to make another \$100 bet on the coin flip, but assume that the existing counterparty either does not want to or is not available. Thus, the taxpayer makes another \$100 bet on the same coin flip with an unrelated speculator (for example, if there were no other counterparties willing to take the bet). The taxpayer wins the coin flip, and the initial, solvent counterparty pays the taxpayer \$100. The speculator, however, does not pay. The taxpayer ends up paying \$50 to the government and is left with only \$50. If the taxpayer loses the coin flip, however, the taxpayer pays \$100 to the initial counterparty and \$100 to the speculator, receiving \$100 from the government for the loss. Literally, for the speculator, it is "heads I win, tails you lose" situation, created solely by the introduction of an income tax.¹⁴³

The net result for the government is to bear half of the risk on the initial investment in the risky asset due to the market signal malfunction—the same result as if the taxpayer had not entered into any Domar-Musgrave transaction—plus providing incentives for excess risk-taking by speculators at the expense of existing investors. In other words, the creation of demand for derivative counterparties by the introduction of the income tax serves to *transfer* part of the benefit of the risky asset from the taxpayer to the speculative counterparties, because increased demand for derivatives increases the need for speculators, which itself increases the amount of unpriced default risk in the system as a whole.

In many ways, the distributional malfunction is a manifestation of the transaction cost distributive problem already identified in the literature.¹⁴⁴ For example, if a taxpayer borrows money to scale up an investment in response to the imposition of an income tax, the taxpayer bears the cost of capital and the lender profits from making the loan, while the demand for increased loans was generated by the imposition of the income tax. Thus, the imposition of the income tax serves to transfer part of the benefit from the taxpayer to the lender. The main difference in the distributional malfunction is that it is embedded in the interaction of the derivatives market and the income tax, rather than more transparent through the increased cost of capital, such as higher interest rates, and thus can be invisible to both the taxpayer and the government.

IV. THE IMPLICIT SUBSIDY: CAN AN INCOME TAX SUBSIDIZE FINANCIAL SPECULATORS?

Under the model, the combination of an income tax and a liquid derivatives market with speculators providing liquidity results in (1) *all* investors who utilize liquid market derivatives to mitigate the income tax bearing the distributional malfunction, regardless whether their particular counterparty is a liquidity provider, and (2) the government bearing a

143. For a more detailed example, see the Appendix.

144. See Cunningham, *supra* note 92, at 33, 35-36.

portion of the speculator's default risk due to the market signal malfunction. As a result, both the government and the investor are in a sub-optimal position as compared to the initial utility-maximizing equilibrium. Whether and to what extent these occur no longer rests on the ability of taxpayers to scale up investments, or of the government to rebalance its portfolio, but rather solely on how effectively the speculators identify and manage their own default risk.¹⁴⁵

With respect to (1), all *investors* in risky assets prior to the introduction of an income tax would effectively subsidize speculative liquidity providers through the increased demand for derivatives and the distributional malfunction. With respect to (2), it is actually possible for all *taxpayers*, regardless if they own risky assets, to subsidize liquidity providers as well, since the government is placed in a sub-optimal investment profile. Even if a subsidy to liquidity providers by investors in risky assets was not troubling, the potential subsidy by all taxpayers, even those with no connection to financial markets or financial speculators, requires closer attention so appropriate responses can be considered.

A. HOW INVESTORS CAN SUBSIDIZE SPECULATORS IN THE REAL WORLD

Applying the results from the model to "real world" financial derivatives markets requires an inquiry into the following questions: (1) is there a unique class of investors serving the role of liquidity providers to the financial derivatives markets; and (2) if so, who bears the costs of the default risk of such liquidity providers. As discussed in Part II, it turns out that there is such a class of investors—liquidity providers—and that all investors in financial derivative assets traded on liquid exchanges bear a portion of their default risk due to the imperfect functioning of liquid markets and clearinghouses.

Further, and perhaps more importantly, under Domar-Musgrave it is the presence of the income tax *itself* that incentivizes taxpayers to enter the derivatives market so as to mitigate the tax on risk. Thus, the greater the income tax on risk, the more investors in risky assets will have an incentive to demand derivatives to rebalance, requiring more liquidity in the market, leading to more liquidity providers. As more liquidity providers enter the liquid derivatives market, greater default risk is shifted onto the market, concentrating more default risk exposure at the clearinghouse, which is spread among all the derivative contracts traded on the exchange, resulting in all derivative investors bearing a portion of this increased risk. Since the clearinghouse and the market cannot perfectly price this risk into its contracts, all investors bear a share of this unpriced credit risk, solely due to the imposition of an income tax.

145. To the extent hedge funds utilize "Value at Risk" models to do so, it is likely that they are not effectively managing their liquidity risk, at least in the face of market downturns. See Kambhu et al., *supra* note 70, at 6; see also Davidoff, *supra* note 56, at 252-53.

Assuming this is correct, the issue then becomes to what extent an actual income tax may result in such an implicit subsidy, as opposed to the stylized model. Among other things, an actual income tax does not provide for full loss offsets,¹⁴⁶ has progressive tax rates¹⁴⁷ and preferential capital gains tax rates,¹⁴⁸ and primarily utilizes a realization regime rather than a mark-to-market regime,¹⁴⁹ any one of which could impact the conclusions drawn from the model.¹⁵⁰

What is interesting with regard to the implicit subsidy, however, is that the shift from the model to the real world income tax can actually serve to exacerbate, rather than mitigate, some of the problems identified in the model. For example, limiting the deductibility for a risky loss can act as a form of penalty on investors that happen to lose their risky investment, by removing the government's share of the loss.¹⁵¹ This may or may not be considered problematic from a normative perspective.¹⁵² On the one hand, since nobody knows who will be winners and who will be losers *ex ante*, it seems unfair to punish those who happen to lose *ex post* while the winners receive the full benefit of Domar-Musgrave to avoid the tax; on the other hand, it may seem appropriate to punish speculators who incur large losses by disallowing their tax benefits.¹⁵³

Regardless of the normative conclusion on this issue generally, the results prove particularly troubling in the context of financial derivatives traded on liquid exchanges, because disallowing losses would disproportionately harm real investors while having little impact on speculators. For example, assume an investor buys one share of risky stock and then, in response to the imposition of a tax, enters into a derivative with respect to the share of stock with a speculator. If the stock loses value, the investor would lose money on both the asset and the derivative; since the investor would also be disallowed any tax benefit from the loss, the investor would bear the entire loss. If the stock increases in value, however, the investor would win on the stock but on the derivative the counterparty could simply default. The investor would only win on half of the bet, while the speculator would incur a loss. The speculator would

146. See, e.g., 26 U.S.C. § 1211 (2000).

147. 26 U.S.C. § 1(a)-1(d) (2000).

148. 26 U.S.C. § 1(h) (2000).

149. 26 U.S.C. §1001 (2000); *Cottage Sav. Ass'n v. Comm'r*, 499 U.S. 554, 559 (1991); *cf.* 26 U.S.C. § 475, § 1256 (2000).

150. For example, not allowing full loss offsets has often been pointed to as an example of how the actual income tax may reach risk-based returns notwithstanding Domar-Musgrave, although not necessarily in an optimal manner. See Deborah H. Schenk, *Saving the Income Tax with a Wealth Tax*, 53 TAX L. REV. 423, 430 (2000) (“[A]n income tax with loss limitations imposes a burden on the return to risk on capital only for those who cannot avoid the limitations . . .”).

151. See Weisbach, *supra* note 4, at 40 (“The main effect of taxing risky returns with graduated rates, therefore, is to hurt those who are worse off.”).

152. *Cf.* Huang, *supra* note 15, at 514-15.

153. See Sarah B. Lawsky, *Fairly Random: On Compensation Audited Taxpayers*, 41 CONN. L. REV. 161, 171-74 (2008).

be indifferent to this, however, since they never intended to incur a real loss in the first place.

In this case, in all circumstances the loss limitation would serve only to harm the real investor who entered into the derivative solely due to the imposition of the income tax, while doing nothing to the incentives of the pure gambling speculator. The only alternative available to such an investor *ex ante* would be to not enter into a Domar-Musgrave transaction, which would also punish the investor because such an investor would effectively bear a tax on their winning risky returns. Either way, *ex post* the imposition of a tax with loss limitations by the government would disadvantage losing investors, both as compared to winning investors and to speculators.

A similar analysis applies to progressive rates. As discussed above, under an income tax with a single rate, neither winners nor losers of risky bets need be taxed on the risky portion of the investment. If rates are progressive, however, two results arise: first, the winner pays a higher rate of tax on income because it places them in a higher tax bracket, and second (and perhaps more importantly) the loser's deduction is worth less because it places them in a lower tax bracket.¹⁵⁴ This is particularly troubling in the case of the implicit subsidy, because the sole reason for the investor to engage in the derivative in the first place is the imposition of an income tax. To the extent any taxpayers utilize derivative contracts to mitigate the income tax, this incremental risk is being imposed solely due to the government's decision to impose an income tax on risk, and thus should (at a minimum) be taken into account in crafting a normative response.¹⁵⁵

The issue, therefore, becomes to what extent investors actually increase their exposure to risky assets in response to an income tax in the real world. At first glance, this question may appear fatal to the applicability of the implicit subsidy in the real world, since mass increases in investment in risky assets by individuals, as predicted by the model, have not been observed.¹⁵⁶ It is possible, however, that this can be attributed not to the fact that people do not adjust portfolios in response to tax, but rather that the changes in the investment profile predicted in the model

154. See Weisbach, *supra* note 4, at 40-41.

Presumably, those in favor of progressivity and redistribution would oppose such a system[;] . . . those who lose their bets would be much happier with a flat or regressively graduated rate schedule than a progressively graduated rate schedule. . . . If our goal is to help those who lose their bets, it is hard to see why we would want graduated rates.

Id. This position has been criticized on the basis that it assumes a flat normative tax rate, while assuming a starting position of a graduated rate would not necessarily have the same implication. See Zelenak, *supra* note 7, at 906-07.

155. See *id.* at 908-09.

156. See James R. Repetti, *Democracy and Opportunity: A New Paradigm in Tax Equity*, 61 VAND. L. REV. 1129, 1171 (2008) ("There is no evidence that investors employ the portfolio adjustment technique described above. None of the portfolio managers for hedge funds and mutual funds to whom I have spoken take advantage of this opportunity by grossing up their investments.").

would result only from *changes* in a tax system—the larger the change, the larger the adjustments.¹⁵⁷ Under a stable income tax system, investors do not rebalance their investments but rather simply purchase risky assets on an after-tax basis. Economically, however, this is the same as if they entered into two transactions: first, determining an ideal exposure to risk *absent* an income tax, and second, *adjusting* portfolios to reflect tax rates.¹⁵⁸ It is therefore possible to argue that portfolio adjustments do occur, but that they are merely embedded in the after-tax calculation of investors. As a result, it would be difficult, if not impossible, to empirically identify portfolio responses to the income taxation of risk in a relatively stable situation.¹⁵⁹ It intuitively makes sense that investors take taxes into account in determining their investments, however, and it is difficult to identify any theoretical reason to the contrary.¹⁶⁰

Thus, assuming investors acquire risky assets on an after-tax basis, demand for risky assets in a world with an income tax would be higher than demand for risky assets in a world without an income tax.¹⁶¹ Taking into consideration the transaction costs of acquiring risky assets in the real world, the assumption of increased demand for derivatives seems reasonable as well.¹⁶² To the extent that increased demand for risky assets shifts to the derivatives market, the price of the risky asset will not increase, reducing nominal prices on the risky assets. Consequently, not only would investors in the derivatives market bear the cost of the implicit subsidy through their derivative contracts, but all investors in risky assets could bear some of the implicit subsidy through reduced prices as well.¹⁶³

B. HOW TAXPAYERS CAN SUBSIDIZE SPECULATORS IN THE REAL WORLD

Even taking the distributional malfunction as a given, the subsidization of liquidity providers by investors in risky assets in the real world may not trouble some, since it only impacts those who invest in risky assets in the first place. Perhaps more troubling, however, is the possibility that tax-

157. See Weisbach, *supra* note 4, at 43-44.

158. See *id.*

159. See *id.* at 45-46.

160. See *id.* at 44.

161. See Terrence R. Chorvat, *Apologia for the Double Taxation of Corporate Income*, 38 WAKE FOREST L. REV. 239, 263 (2003) ("The income tax has forced the investor to have a portfolio that is riskier on a pre-tax basis. Hence, while the private risk to the investor has not changed, total risk undertaken by society has. It is the government that bears the additional risk."). This assumes that the government does not rebalance its risk into the market, which would be the case in a world with the market signal malfunction.

162. See *supra* notes 38-40 and accompanying text.

163. This is because the government bears default risk but the benefit of the government bearing such risk would not be fully reflected in the price of the underlying asset. This result holds to the extent the government bears the risk; to the extent the government offsets the risk in the market, the system returns to equilibrium. Due to the market signal malfunction, however, the government will bear some default risk and the full price benefit of the government's risk-bearing will not be reflected in the market price of the risky asset.

payers more generally, regardless whether they invest in risky assets, could bear some of the costs of the implicit subsidy.

Under the general equilibrium model, it was assumed that the government would rebalance its investment portfolio to the extent there was a market signal that the government was bearing an undue amount of risk after the imposition of a tax. In reality, however, the government does not short individual stocks *en masse* in the market. It has been argued that, rather than disprove the theory, this could mean simply that the government prefers the risk exposure through the income tax, and thus would only rebalance if it were to adopt a non-income tax.¹⁶⁴ This may make sense if the government was willing to make revenue contingent on systemic risk of the economy as a whole, since a broad-based income tax would be the equivalent of a diversified domestic portfolio. It becomes less persuasive in the case when a “new” idiosyncratic risk (that is, speculator default risk) is introduced into the system. In such a case, even if the government preferred exposure to systemic risk, it might not prefer exposure to this new idiosyncratic risk. This concern is magnified to the extent of the market signal malfunction, since the government cannot even determine that it is bearing such risk solely through market price fluctuations, let alone decide whether it would prefer to do so.

The extent and amount of the risk borne by the government depends solely on the amount of unpriced credit risk embedded in derivative contracts traded on the liquid derivatives market.¹⁶⁵ Assuming the amount of risk is non-negligible, it is a net cost of an income tax with relaxed assumptions to introduce a liquid derivatives market that has not yet been taken into account in the literature. Given the experience of Volume Investors in 1985, the stock market crash of 1987, the currency and debt crisis of 1998, and the most recent “credit crunch,” it is presumably a safe assumption that such risk is at a minimum non-negligible.¹⁶⁶

In the real world, with respect to the government, disallowing loss deductions may help offset some of this assumed non-diversifiable risk by raising additional revenue. Any such benefit would be achieved only in a very rough manner, however, since the benefit to the government would be the risk-adjusted present value of the original risky asset losing, which is likely different than the risk-adjusted present value of the default risk

164. See Weisbach, *supra* note 4, at 52.

165. Since this information is private and is built into the models utilized by hedge funds to dynamically hedge their derivative positions, the present value of such risk is currently not subject to accurate measurement. It is thus unclear to what extent this impacts the present value of the risk borne by the government. Even if such risk could be measured, however, that would impact only the scope of the response and not the presence of the problem.

166. See, e.g., IMF HEDGE FUND REPORT, *supra* note 8, at 50 (“One of the lessons from the failure of LTCM is that liquidity can disappear quickly during periods of market stress . . .”).

assumed by the government.¹⁶⁷ In addition, loss limitations would place the government in the unusual position of being better off from a revenue perspective when risky assets lose. Thus, not only would loss limitations harm precisely the taxpayers who engaged in derivatives solely in response to the imposition of an income tax in the first place, it would also create perverse incentives as between the government and investors more generally.

Even if this was not troubling from a normative perspective, loss limitations would do nothing to offset the sub-optimal over-supply of liquidity providers in the market, as compared to the no-tax world, since they would do nothing to change the market signal malfunction. Further, as discussed below, any such means of raising revenue would also presumably be less efficient than allocating the cost to other less elastic tax bases (including, as discussed below, by doing nothing and allowing the cost to be borne by investors and taxpayers as a whole). In this manner, adopting an income tax that limits or disallows loss deductions in a world with imperfect financial markets could serve to exacerbate the distributional malfunction as between investors and liquidity providers without solving the market signal malfunction. Similar analyses hold for progressive rates and realization.

Even more troubling, the subsidy arises from liquidity providers entering into derivative contracts with United States taxpayers as counterparties, regardless of whether the liquidity provider itself is subject to United States tax. In particular, offshore hedge funds (not subject to United States tax) exacerbate the distributional malfunction, since not only can they default upon a loss, but the government does not share in the winning bets of the hedge fund if the fund is not subject to United States tax. That a number of liquidity providers are established offshore and do not pay United States net income tax serves only to increase the detrimental cost of the implicit subsidy.

Further, where the derivative is traded is irrelevant to the analysis. For example, a United States taxpayer trading derivatives on a London or Tokyo exchange would not necessarily avoid the problem, because the United States taxpayer would be subject to the United States income tax on such investments. As a result, the imposition of an income tax would create demand for such derivatives, thus subjecting the taxpayer to the distributional malfunction to the extent the taxpayer bore unpriced default risk through the operation of the market.

Since the market does not return to equilibrium, someone in the system must not return to the optimal investment position they were in prior to the introduction of the income tax. There are two costs being borne: (1) the investment risk assumed by the government, and (2) the speculative risk being transferred to the derivative investor. With respect to (2),

167. See Schenk, *supra* note 150, at 430 ("Even assuming we wanted to impose a tax burden on the return to risk, doing so by adding loss limitation rules to a normative income tax is a remarkably inefficient and inequitable way to do so.").

the distributive malfunction may impact overall utility—depending on the relative utility curves of the investor and the counterparty—but should not impact the market price of the underlying asset, and thus would not need to be taken into account to achieve equilibrium (although normative considerations may require some response).¹⁶⁸

With respect to (1), however, the simplest and most apparent response of the government would be to raise revenue to offset market losses as they occur through the imposition of an incremental tax on a non-risk based return. Under optimal tax theory, the base for this tax should be the base with the lowest relative marginal elasticities (of labor in the case of an income tax, or of consumption in the case of a commodity or other consumption tax), so that the incremental tax would result in the least distortion to the utility maximizing decision-making process.¹⁶⁹ Presumably, the lowest marginal elastic base in the current United States tax system would be some component of the domestic labor-wage base, and most likely the non-information based (and thus less mobile) labor-wage base.¹⁷⁰ In more colloquial terms, the government could tax Main Street to pay Wall Street.¹⁷¹ Assuming this is the case, solely through the imposition of an income tax on risk in a world with a liquid derivatives market, absent any other changes, the domestic labor wage base could be forced to incur a greater tax burden to the extent the government bears speculator default risk through the imposition of an income tax.

Of course, raising taxes is not the only option available to the government. Rather than raise taxes, the government could print money to pay the obligation, which would result in large increases in the money supply and thus significant inflation—effectively a tax on all consumption.¹⁷² Another option would be for the government to borrow to fund the shortfall, which would merely shift the burden onto future taxpayers.¹⁷³

168. See Zelenak, *supra* note 7, at 895-896.

169. See generally RICHARD A. MUSGRAVE & PEGGY B. MUSGRAVE, *PUBLIC FINANCE IN THEORY AND PRACTICE* (4th ed. 1984).

170. For a discussion of the relative mobility of labor classes, see David S. Law, *Globalization and the Future of Constitutional Rights*, 102 Nw. U. L. REV. 1277, 1323-42 (2008).

171. For an example in a different context, see David Stout, *The Wall Street Bailout Plan, Explained*, N.Y. TIMES, Sept. 21, 2008, at A32 (“[Y]ou could argue that people who cannot tell soybean futures from puts, calls and options are being asked to clean up the costly mess left by Wall Street.”).

172. Inflation due to the government printing money in response to obligations acts as a form of implicit tax on all domestic consumption through increased prices based on relative elasticities of demand for various goods and services in the economy. See Weisbach, *supra* note 4, at 54 n.110 (“The government could attempt to pay off the debt by printing money, but the resulting inflation would be equivalent to a tax change.”). The allocation of this cost throughout the entire domestic consumption economy would likely be more distortive, and thus less efficient, than explicitly allocating this cost onto a single low elasticity base, such as the domestic labor wage base, although it is ultimately an empirical question.

173. Alternatively, the government could borrow, not as a means to shift the obligation intergenerationally, but rather as a means to redistribute the risk into the market. See Weisbach, *supra* note 4, at 53-54. Weisbach states:

Borrowing can shift tax receipts across periods, but in the long run, government inflows must equal outlays. . . . Because the government budget must be in long-term balance, this state of affairs is not an equilibrium. If the new

Regardless of which alternative the government turns to, however, the implicit subsidy problem remains; the only difference would be upon which base the costs would be shifted. As a result, to the extent the government bears default risk of speculators through the imposition of an income tax, some other base must subsidize it, at least as compared to the no-tax world.

This result, combined with the distributional malfunction, can result in a subsidy to speculators at the expense of investors in risky assets, and potentially of all taxpayers. Not only does this raise normative distributional concerns, but as compared to the no-tax world, such a subsidy could also lead to a sub-optimal over-supply of speculators in the market. By the government assuming some of the risks of speculation through the income tax, the present value of speculation would be increased, potentially contributing to overspeculation and thus excessive risks in the financial markets, leading to periodic "crunches" of liquidity in the financial markets as well.

V. RETHINKING THE ROLE OF A MODERN INCOME TAX IN A WORLD WITH IMPERFECT FINANCIAL MARKETS

Once the taxation of speculators and financial markets is analyzed from the perspective of implicit subsidy, a very different approach to conceptualizing their tax treatment arises as well, because even assuming no timing, rate, or character benefit to speculators, speculators may still be subsidized through the imposition of an income tax. Any normative approach to the taxation of financial markets that starts with an ideal income tax model must therefore start with remedying this distortion before addressing the complications which arise from timing, rate, and character differentials. Maximizing the optimality of the taxation of financial markets in this manner can permit a better understanding of how to craft an optimal response to the threat of imperfect financial markets and financial speculators in the real world.¹⁷⁴

tax regime is to remain and if spending is to remain fixed, the government must adjust its portfolio to maintain budget balance. A pure "no adjustment" position is unsustainable. . . . Borrowing should not change this result. . . . The borrowing . . . would be equivalent to selling the risky asset short. The reason why is that . . . [t]he debt is entirely dependent on risky flows. It is effectively equity that the government has sold short, just as the model requires. If the underlying flows are risky, borrowing will be risky. Borrowing, therefore, cannot change the basic equivalences and the need for some type of adjustments when tax regimes change.

Id. In reality, it is unlikely that the United States government would default on debt solely to allocate its share of default risk assumed through the imposition of an income tax into the market, since a default in United States debt would likely result in a much greater financial instability to the economy as a whole than the cost of the government bearing the risk in the first place.

174. For example, the income tax literature has identified hedge funds as a potential challenge to the viability of the income tax regime, particularly the international income tax regime. *See, e.g.,* Michael J. Graetz & Itai Grinberg, *Taxing International Portfolio Income*, 56 *TAX L. REV.* 537, 584-85 (2003); Vito Tanzi, *Globalization, Technological Developments, and the Work of Fiscal Termites*, 26 *BROOK. J. INT'L L.* 1261, 1272-73 (2001).

A. SAVING THE INCOME TAX WITH A DERIVATIVE TRADING TAX¹⁷⁵

Through the imposition of an income tax, the government may bear the cost of default risk due to taxpayers utilizing liquid derivatives markets to mitigate the income taxation of risky assets. What lessons can this provide to the debate over the current income tax?

Assuming the implicit subsidy results in an over-supply of liquidity providers as compared to the no-tax world, and a corresponding change in market equilibrium, one solution to return to the no-tax equilibrium would be for the government to internalize the cost of such subsidy to the liquidity providers themselves, mitigating the distortions to the derivatives market. The difficulty with such an approach is two-fold: (1) the government would have to calculate the default risk of each particular liquidity provider, and (2) the government would have to identify liquidity provider counterparties as opposed to hedging investors or other non-speculative investors.

Even assuming the feasibility of such undertakings (for example, if there was a mandatory information reporting regime for speculators and full compliance), which is unlikely, both of these requirements would impose significant administrative costs both on the government and on the liquidity providers themselves. As a result, there is no way to guarantee that such an approach would be a better second-best solution than the current implicit subsidy, especially given the liquidity and risk allocation function that liquidity providers play more generally in the economy.¹⁷⁶ This concern only grows as the feasibility of such an approach decreases in light of proprietary trading information and lack of financial disclosure existent in the modern financial community.

If an income tax specifically on liquidity providers to internalize the costs of the government subsidy of risk was not possible, alternatively, the government could impose higher marginal tax rates on derivatives more generally as compared to other financial assets such as stocks or bonds. This would result in liquidity providers paying a higher amount of tax on their derivative investments, reducing the yield on their speculative investments and thus mitigating the implicit subsidy. The problem is that such an approach would be both over- and under-inclusive, since derivatives entered into by hedging investors (which do not raise the same concern as derivatives entered into by speculators) would also be subject to the increased marginal tax rate.¹⁷⁷ Perhaps more importantly, an increase in the income taxation of derivatives could lead to a perverse incentive serving only to exacerbate the subsidy cycle rather than mitigate

175. This heading is a variation of the title of Professor Schenk's influential article, *Saving the Income Tax with a Wealth Tax*. See Schenk, *supra* note 150.

176. The theory of second-best provides that incremental movements towards an ideal can actually be sub-optimal from an overall welfare standpoint if at least one variable is constrained. See generally R. G. Lipsey & Kelvin Lancaster, *The General Theory of Second Best*, 24 REV. ECON. STUD. 11 (1956).

177. Such a policy would also allow manipulation of this difference in rate by taxpayers at the expense of the government. See, e.g., Schizer, *supra* note 17, at 1897-99.

it: an increase in the income tax could lead to an increase in demand for derivatives under Domar-Musgrave to mitigate the incremental income tax, in turn increasing the demand for liquidity providers and thus increasing the default risk in the market.

Since an income tax directly on liquidity providers may not be feasible, and increased marginal income tax rates on derivatives traded on the liquid market may cause other problems that would outweigh their marginal benefit, perhaps the government should consider adopting a policy similar to that already embedded in the derivatives market by the actors in the market themselves. As discussed above, the liquid derivatives markets adopted clearinghouses, margin, netting, and mark-to-market on their own as means to prevent pure risk gambling speculators from bringing undue default risk into the liquid market. These measures served to make it prohibitive for pure gambling speculators to trade on the liquid derivatives market, but at the cost of a small increase in the relative price of each derivative traded on the market. Presumably, since the market was willing to tolerate an increased price on each derivative trade as a means to minimize default risk in the market, a similar solution could be appropriate for the increased default risk arising from the income taxation of risk as well.

Along these lines, two alternatives would be possible.¹⁷⁸ The first would be to adopt a mandatory self-insurance fund for speculators entering into derivative contracts on a liquid exchange, similar to funds such as the Pension Benefit Guaranty Corporation.¹⁷⁹ In essence, the mandatory self-insurance would act as an incremental margin requirement for liquidity providers, which would protect investors as a whole from default of any one large speculator. Such a proposal could address the distributional malfunction by internalizing the cost of potential default to large derivative counterparties and protecting smaller investors from such defaults. A problem with such an approach, however, is that it does not necessarily address the market signal malfunction, since it would be unrelated to the price of the underlying asset and would not raise any revenue for the government to offset its sub-optimal risk position. Further, as with other proposals, it would be both over- and under-inclusive in that it would be difficult to apply solely to liquidity providers and not to other derivative counterparties, such as hedging investors. Thus, although such

178. A third, significantly different, alternative would also be available: to replace the income tax with a cash-flow consumption tax. This would exempt taxation on the risky portion of assets but maintain the tax burden on risk-free and inframarginal returns. See, e.g., Joseph Bankman & David A. Weisbach, *The Superiority of an Ideal Consumption Tax Over an Ideal Income Tax*, 58 STAN. L. REV. 1413, 1417 (2006). This Article assumes a normative income tax and thus does not address the larger choice of tax base debate, although the lessons learned from this model could be relevant to that debate as well. See, e.g., William J. Turnier, *Theory Meets Reality: The Case of the Double Tax on Material Capital*, 27 VA. TAX REV. 83, 83 (2007).

179. See, e.g., David A. Moss, *Risk, Responsibility, and the Role of Government*, 56 DRAKE L. REV. 541 (2008). I am indebted to the participants of the Loyola L.A. Law School Tax Colloquium for this suggestion.

a proposal might be useful, and even appropriate for non-tax reasons, it would not be sufficient to fully address the implicit subsidy.

Second, the government could impose a tax on the entering into, and each trade of, a derivatives contract on the liquid market (a “derivatives trading tax”) in response to the implicit subsidization of liquidity provider default risk. This is not necessarily a radical idea; in fact every president from Ronald Reagan to George W. Bush has proposed some sort of tax or fee on futures trading.¹⁸⁰ The difference is that, for the first time, the trading tax would be introduced to make the *income tax* more equitable and efficient, rather than to offset inefficiencies in the securities markets, raise revenue, or accomplish other separate goals.

In many ways, this similar to prior proposals for a Securities Transactions Excise Tax (STET), which, among other iterations, proposed a 0.5% excise tax on the trading of all publicly traded securities.¹⁸¹ The STET was initially proposed as a means of reducing excess volatility on securities markets arising from the proliferation of day-traders and other speculators.¹⁸² The underlying theory was that the volatility caused by speculators outweighed the liquidity benefits of their presence on the markets, and thus a STET could lead to a more efficient market by increasing the cost of speculation, while at the same time raising revenue for the government.¹⁸³ This conclusion faced strong opposition by others who claimed that the liquidity benefits outweighed any volatility concerns, and thus that a STET would do more harm than good.¹⁸⁴

Unlike a STET, the derivatives trading tax proposal would not be intended to correct a market failure such as excess volatility, but rather to correct a distortion in financial markets caused by the imposition of an income tax. From this perspective, prior efficiency analyses of the impact of a STET on financial markets which did not take into account the implicit subsidy would not directly address the issue of the efficiency of a derivatives trading tax in a world with the implicit subsidy. Taken from

180. See Mark Jickling, Cong. Research Serv., Proposed Transaction Fee on Futures Contracts (2006), available at www.nationalaglawcenter.org/assets/crs/RS22415.pdf (last visited Jan. 21, 2009). For example, the first Bush Administration proposed fees ranging from 11 cents to 15 cents, while the Clinton Administration proposed a fee of 14 cents, on futures trading. See Craig S. Hakkio, *Should We Throw Sand in the Gears of Financial Markets?*, 79 *ECON. REV.* 17, 18 (1994). Further, this idea has begun to receive renewed interest in light of the credit crunch. See, e.g., Bob Herbert, *Where the Money Is*, N.Y. TIMES, Jan. 13, 2009, at A25.

181. See, e.g., R. Glenn Hubbard, *Securities Transactions Taxes: Tax Design, Revenue, and Policy Considerations*, 61 *TAX NOTES* 985, 986 (1993); Scott W. MacCormack, *A Critique of the Reemerging Securities Transfer Excise Tax*, 44 *TAX LAW.* 927, 927 (1991).

182. See Lawrence H. Summers & Victoria P. Summers, *When Financial Markets Work Too Well: A Cautious Case for a Securities Transactions Tax*, 3 *J. FIN. SERVS. RESEARCH* 261, 268-69 (1989); Joseph E. Stiglitz, *Using Tax Policy to Curb Speculative Short-Term Trading*, 3 *J. FIN. SERVS. RESEARCH* 101, 110-15 (1989).

183. See Summers & Summers, *supra* note 182, at 285; Stiglitz, *supra* note 182, at 113.

184. See, e.g., STAFF OF JOINT COMM. ON TAXATION, 100TH CONG., DESCRIPTION OF POSSIBLE OPTIONS TO INCREASE REVENUES PREPARED FOR THE COMMITTEE ON WAYS AND MEANS 82 (Comm. Print 1987); Tamar Frankel, *What Can Be Done About Stock Market Volatility?*, 69 *B.U. L. REV.* 991, 995 (1989); Hubbard, *supra* note 181, at 989-90.

this perspective, the derivatives trading tax could be a more efficient solution to the implicit subsidy than allocating the burden to other income tax bases, such as the labor-wage base or the consumption base, because it would serve as a cost on the provision of liquidity to the market rather than on the gains derived from doing so, by taxing the number of trades rather than the fortune of winning on risky bets.

As with the STET, one concern with a derivatives trading tax could be that it would unintentionally fall on individuals and retirement funds rather than speculators.¹⁸⁵ The derivatives trading tax would be less problematic in this respect, in part because a STET was designed to fall on both derivatives and financial assets such as stocks and bonds. Unlike investors in stocks and bonds, speculators are required to engage in larger number of trades on the liquid derivatives market, either to act as liquidity providers or to reallocate their speculative bets as the risk moves over time through dynamic hedging. By limiting the transaction tax to the liquid derivatives market, trades by investors or retirement funds in financial assets such as stocks or bonds would not be subject to this tax;¹⁸⁶ conversely, since the business model of liquidity providers is to provide liquidity to financial markets, investing in underlying financial assets as a means of avoiding the tax would not be available to them.¹⁸⁷ This fact alone could favor adoption of a derivatives trading tax as compared to the STET.¹⁸⁸

This tax would also avoid most of the information and administrative costs of other proposals, such as an income tax on or mandatory self-insurance fund for liquidity providers. First, it would be relatively easy to impose and collect;¹⁸⁹ given that clearinghouses already serve as a center for pooling of derivative trading and margin accounts and by necessity know the number of trades and parties involved in each trade, the clearinghouse could easily serve as collection agent for such a tax. Further, clearinghouses acting as collection agents would not bear any risk

185. See, e.g., Hubbard, *supra* note 181, at 992-93.

186. If retirement funds were a particular concern, trades entered into by pension funds, IRAs, and 401(k) accounts could be exempted from the tax, although this would add complexity and some potential for abuse.

187. Applying a STET exclusively to futures markets has been considered in the past and has been criticized primarily on the liquidity/volatility analysis and on the international competitiveness analysis. See Franklin R. Edwards, *Taxing Transactions in Futures Markets: Objectives and Effects*, 7 J. FINANCE SERVS. RESEARCH 75, 77-78, 83-86 (1992). Since the purpose of the derivatives trading tax would be precisely to internalize the costs of trading on speculators in derivatives due to the implicit subsidy, this criticism is less relevant to the derivatives trading tax than the STET.

188. Further, some studies suggest it is possible in certain circumstances that a trading tax could actually be Pareto improving. This would tend to be the case in a situation where the income tax creates distortions in demand for speculative derivative counterparties, further supporting a derivatives trading tax in this context. See James Dow & Rohit Rahi, *Should Speculators Be Taxed?*, 73 J. BUS. 89, 89-90 (2000); Frank M. Song & Junxi Zhang, *Securities Transaction Tax and Market Volatility*, 115 ECON. J. 1103, 1103 (2005).

189. See U.S. GEN. ACCOUNTING OFFICE, REPORT TO CONGRESSIONAL COMMITTEES, A FUTURES TRANSACTION FEE IS ADMINISTRATIVELY FEASIBLE (1993), available at <http://archive.gao.gov/t2pbat5/150186.pdf>.

on the payment of the tax itself, since they would have access to sufficient cash to remit the tax through claims on the speculator's margin accounts. Unlike an income or excise tax on or a mandatory self-insurance fund for liquidity providers, a derivatives trading tax would not require the government to expend resources in identifying which derivative investors were entering into transactions as liquidity providers as opposed to other investors. Rather, the tax would be imposed solely on the entering into of the trade, a purely objective and readily obtainable measure.

Although a derivatives trading tax has many benefits, the primary obstacle with this approach would be setting the optimal rate. Any rate in excess of the optimal rate would deter the entering into derivative contracts and could result in less efficient risk allocation in the economy as a whole. A rate lower than the optimal rate would mitigate the market-signal and distributional malfunctions, but would not completely alleviate it. Since the information on the amount of default risk borne by taxpayers and the government is proprietary to the liquidity providers,¹⁹⁰ any rate would be, at best, an educated guess and, at worst, arbitrary, and thus potentially sub-optimal even as compared to the current tax regime.¹⁹¹ Regardless, a first step could, and should, be the imposition of a low-level derivatives trading tax, which, at a minimum, would raise some revenue to offset the sub-optimal risk position of the government in a more efficient and equitable manner than disallowing losses or increasing tax rates on derivative instruments themselves. Based on previous studies related to the STET, a rate lower than 0.5%, or a fixed amount less than ten cents per trade, could be low enough to avoid significantly distorting the derivatives market while partially offsetting the implicit subsidy, although further theoretical and empirical work would need to be done to calibrate the final specific rate.¹⁹²

Perhaps more importantly, however, the derivative trading tax would increase the incentive to trade on other markets not subject to the tax. One option would be for speculators to enter into derivatives on non-liquid markets or directly in underlying financial assets, each of which would increase transaction costs but decrease the implicit subsidy, which is precisely the intended effect. More concerning, however, the tax would only be effective to the extent investors did not have an alternative non-United States market on which to enter into the derivative. If such alternatives did exist and the cost of the tax exceeded the sum of the incremental benefit of a United States liquid exchange plus the incremental transaction costs of executing such trades on a market outside of the

190. See *supra* notes 71-72 and accompanying text.

191. This represents a classic second-best problem. See Lipsey & Lancaster, *supra* note 176, at 11. Regulatory means to increase pricing information might ameliorate, but not solve, this tax problem, although the costs and benefits of such a solution would require an analysis of much more than just the tax impact. See, e.g., Paredes, *supra* note 14, at 1034-35.

192. Recent proposals for a futures contract user fee have set the fee at a fixed amount of \$.07 per trade, which is a fraction of the \$.50 per trade fee charged by clearinghouses. See Jickling, *supra* note 180, at 2.

United States, speculators would have an incentive to trade on such exchanges in response to the imposition of the trading tax.¹⁹³ This was of particular concern at the time the STET was being considered.¹⁹⁴

This is less of a concern with the derivatives trading tax, however, since the business model of liquidity providers is to act as open counterparties to risk. To profit from this business model, the liquidity provider must provide liquidity to those markets seeking liquidity, and thus would not profit from similar trades on other markets not in need of such liquidity. Nonetheless, this concern remains even in the context of liquidity providers to the extent the trading tax would exceed the sum of the profit from providing liquidity to United States liquid derivatives markets plus the transaction costs of trading elsewhere.

Further, once an open system is taken into account, the possibility of liquidity providers forming offshore so as not to be subject to the tax regime of the United States must also be taken into account. With respect to the trading tax, this would not be problematic because the tax would be on each trade on a domestic exchange regardless where the counterparty is organized. As discussed above, however, the implicit subsidy would be exacerbated because it is the investor who is in the involuntary partnership with the government, notwithstanding that the counterparty is not subject to the United States tax laws. In this manner, the liquidity provider could enjoy the benefit of the implicit subsidy without having to incur the cost of paying an income tax on the gains earned from doing so,¹⁹⁵ only increasing the benefit of the implicit subsidy.¹⁹⁶ As a result, the derivatives trading tax would cease to be effective, notwithstanding that the speculator would still be subject to it, because the benefits of the implicit subsidy would have exceeded the cost of the tax.

193. See, e.g., Jerry W. Markham, *Super Regulator: A Comparative Analysis of Securities and Derivatives Regulation in the United States, United Kingdom, and Japan*, 28 *BROOK. J. INT'L L.* 319, 367-68 (2003) ("Competition from abroad was also posing a major threat to the dominance of the American futures and options markets.").

194. See, e.g., John Campbell & Kenneth Froot, *International Experiences with Securities Transaction Taxes*, in *THE INTERNATIONALIZATION OF EQUITY MARKETS*, (Jeffrey A. Frankel ed., 1994).

195. In some ways, this issue may seem reminiscent of a more traditional "moral hazard" concern, in which the *ex post* actions of the government could lead to excessively risky behavior in the market. See, e.g., Lawrence A. Cunningham, *Too Big to Fail: Moral Hazard in Auditing and the Need to Restructure the Industry Before it Unravels*, 106 *COLUM. L. REV.* 1698, 1698 (2006); Henry T. C. Hu, *Faith and Magic: Investor Beliefs and Government Neutrality*, 78 *TEX. L. REV.* 777, 865-72 (2000) (discussing the moral hazard issue in the context of the Federal Reserve-led bailout of LTCM). The issue of decision-making distortions in an income tax may share some similarities to the moral hazard issue, but they are conceptually distinct. As a result, the scope of a legal or regulatory response to moral hazard concerns for hedge funds, if any, is beyond the scope of this Article. See, e.g., Kambhu et al., *supra* note 70.

196. This phenomenon is similar to that of "divergence" in the area of international tax, where one country bears an undue amount of risk on a risk-based return due to the failure of the international tax rules to balance the taxation of gains with losses on the risky asset. See Mitchell A. Kane, *Risk and Redistribution in Open and Closed Economies*, 92 *VA. L. REV.* 867, 870-71 (2006).

The combination of these two problems demonstrates the biggest problem with a stand-alone transactions tax, such as the derivatives trading tax, as a comprehensive solution to the implicit subsidy: the potential spiraling effect. The ability of liquidity providers to operate offshore, and thus avoid paying income tax, would increase the revenue needs of the government. The derivatives trading tax could serve to mitigate this to some extent, since the tax would be on the privilege of trading derivatives on a liquid market within the United States regardless whether the investor was subject to United States income taxation. As compared to the closed model, however, the rate of a derivatives trading tax would have to be significantly higher to compensate the government for the increasing loss of revenue as the income of liquidity providers escapes income taxation. In this manner, the adoption of a derivatives trading tax could result in a spiral in which the liquidity providers would have increasing incentives to move offshore to avoid the income tax as a means of compensating for paying the trading tax, which would require an increasingly large trading tax to compensate for the loss in revenue, resulting in further increases in the incentive of liquidity providers to locate and trade offshore. A spiraling trading tax itself could lead to a form of tax competition among countries where other countries would be willing to charge a lower (or no) trading tax for trades made on a liquid exchange located in such a country. This could lead to a downward spiral in the viability of the United States liquid exchange itself; as liquidity providers ceased trading on United States liquid exchanges, the exchanges would become less liquid and thus less attractive to new investors.¹⁹⁷

Both of these considerations (that is, the incentive to locate offshore and the incentive to trade offshore) lead to the conclusion that a derivatives trading tax would unlikely be a stable stand-alone solution in a modern financial world.¹⁹⁸ Unlike with the STET, however, this problem could be overcome in the case of the derivatives trading tax precisely because it is intended to serve not as a stand-alone tax but rather as an integral part of the income tax. Consequently, it would become necessary to not only adopt the derivatives trading tax, but also to reconsider the income taxation of offshore speculators as well. In particular, in connection with adopting a derivatives trading tax, the United States would need to reconsider the extraterritorial reach of its income tax regime so as to avoid the pricing spiral effect. Among other possibilities, the United States could extend the reach of its net income tax on the income of offshore speculators, impose a withholding tax on gain from derivatives traded in the United States, or impose an "exit tax" on speculators that

197. Ironically, at the same time, to the extent United States taxpayers enter into derivatives on foreign exchanges, the United States government would continue to subsidize the speculative risk-taking of the liquidity providers regardless on which exchange the derivative was traded.

198. This concern, in part, led to the downfall of the STET proposals. See *supra* note 194 and accompanying text.

leave the country,¹⁹⁹ reducing the spiraling pressure on the derivatives trading tax. In this way, the derivatives trading tax and the international income tax could work together to form a more equitable and efficient overall tax regime in a modern financial world than either tax standing alone.²⁰⁰

The issues to consider in this respect would include a rethinking of what it means to be engaged in the business of trading securities in the United States,²⁰¹ the ability of investors to defer income generated by hedge funds, the character and tax rate of income generated by hedge funds, the taxation of “tax exempt” investors investing in hedge funds,²⁰² and the treatment of the carried interest compensation of the managers.²⁰³ All of these considerations would have to balance the implicit risk subsidy for liquid exchange-traded derivatives with the impact on United States investors, as compared to investors from other countries undertaking similar business models.²⁰⁴

199. Each of these represents a portion of the current international taxation rules of the United States. *See, e.g.*, 26 U.S.C. §882(a) (tax on U.S. business income of foreign corporations), 26 U.S.C. §§951(a) (current inclusion by U.S. persons of certain income earned outside the United States), 26 U.S.C. §§871, 881 (withholding tax on certain U.S. source income), 26 U.S.C. §367(a) (exit tax on certain outbound corporate transactions), 26 U.S.C. §877 (exit tax on certain expatriating citizens); *see generally* CHARLES H. GUSTAFSON ET AL., *TAXATION OF INTERNATIONAL TRANSACTIONS* (3d ed. 2006).

200. *See, e.g.*, Reuven S. Avi-Yonah, *The Three Goals of Taxation*, 60 TAX L. REV. 1, 21 (2006) (“Globalization and tax competition for capital also introduce their own limitations on taxing capital too highly. . . . Thus, a different kind of tax is needed in addition to the income tax.”).

201. *See, e.g.*, Alex Raskolnikov, *The Cost of Norms: Tax Effects of Tacit Understandings*, 74 U. CHI. L. REV. 601, 618 (2007) (discussing the rise of “season and sell” transactions by hedge funds as informal responses to tax rules); Lee A. Sheppard, *News Analysis: Neither a Dealer nor a Lender Be, Part 2: Hedge Fund Lending*, 108 TAX NOTES 729, 730 (2005).

202. *See* Lee A. Sheppard & Martin A. Sullivan, *Offshore Explorations: Caribbean Hedge Funds, Part 1*, 118 TAX NOTES, 95, 95-96 (2008); David A. Stein, *UBIT Issues in Investment Partnerships: What Tax-Exempt Organizations (and Their Taxable Partners) Should Know*, 756 PLI/TAX 453, 459-60 (2007); *see generally* Summer Ayers LePree, *Taxation of US Tax-Exempt Entities’ Offshore Hedge Fund Investments—Application of the Section 514 Debt-Financed Rules to Leveraged Hedge Funds and Derivatives and the Case for Equalization*, 61 TAX LAW. 807 (2008).

203. Because of the nature of liquidity provision and the offshore structure (whether through a master-feeder structure or otherwise) utilized by many hedge funds, the benefits of long-term capital gain are much less problematic for hedge funds than for private equity funds, although deferral may be a stronger concern for hedge funds. *See generally* STAFF OF THE JOINT COMM. ON TAXATION, 110TH CONG., *PRESENT LAW AND ANALYSIS RELATING TO TAX TREATMENT OF PARTNERSHIP CARRIED INTERESTS* (Comm. Print 2007) [hereinafter JCT CARRIED INTEREST REPORT]. It is for this reason, among others, that the debate surrounding the taxation of carried interest for private equity funds should be segregated from the debate over the taxation of incentive fees for hedge funds. *See generally* JCT CARRIED INTEREST REPORT, *supra*; Victor Fleischer, *Two and Twenty: Taxing Partnership Profits in Private Equity Funds*, 83 N.Y.U. L. REV. 1 (2008); Michael S. Knoll, *The Taxation of Carried Interests: Estimating the Revenue Effects of Taxing Profit Interests as Ordinary Income*, 50 WM. & MARY L. REV. 115 (2008); Chris William Sanchirico, *Taxing Carried Interest: The Problematic Analogy to “Sweat Equity,”* 117 TAX NOTES 239 (2007); David A. Weisbach, *The Taxation of Carried Interests in Private Equity*, 94 VA. L. REV. 415 (2008).

204. *See, e.g.*, IMF HEDGE FUND REPORT, *supra* note 8, at 57 (“[H]edge funds operate across national and legal jurisdictions, so a reasonable level of cross-border cooperation

Thus, even under a normative model, in which assumptions have been relaxed solely to introduce the presence of traded derivatives, the taxation of modern financial derivatives markets and liquidity providers requires a fundamental rethinking of how to balance the taxation of the activities of financial speculators, the extraterritorial reach of the income tax over the activities of financial speculators, and the rules applicable to investors and managers of financial speculators.²⁰⁵ Each of these issues necessarily influences the others in unique ways when applied to the implicit subsidy of hedge funds, and thus only under a comprehensive approach, in which all such considerations are balanced at the same time, can any normative policy be crafted.²⁰⁶ A number of these issues have been considered in other contexts,²⁰⁷ but placed in the context of the implicit subsidy to liquidity providers a more comprehensive cost-benefit analysis can be undertaken.

The primary lesson that can be drawn from this analysis is the importance of shifting the debate regarding the taxation of financial speculators from a focus on the income taxation of particular transactions to a more comprehensive approach that takes into account the implicit subsidy to liquidity provision as part of an overall reform of the income taxation of financial speculators in a world with imperfect financial markets. Such analysis will also necessarily become international in nature, not because liquidity providers such as hedge funds happen to be located offshore, but because any normative implications of the taxation and risk model would necessarily implicate incentives to cross national borders in an open model. Any response not taking into account both the implicit subsidy and the international aspects at the same time would be incomplete.

would be required. . . . It is not clear that sufficient cooperation and coordination exists today.”).

205. See, e.g., Jeffrey M. Colón, *Financial Products and Source Basis Taxation: U.S. International Tax Policy at the Crossroads*, 1999 U. ILL. L. REV. 775, 836-43.

206. See generally Avi-Yonah, *supra* note 200.

207. In particular, hedge fund issues are often included in debates regarding specific financial products or structured transactions or debates regarding other private investment funds, such as private equity or venture capital. See, e.g., David P. Hariton, *When and How Should the Economic Substance Doctrine be Applied*, 60 TAX L. REV. 29, 50-53 (2006) (analyzing the economic substance doctrine as applied to hedge funds); Charlene Davis Luke, *Beating the “Wrap”: The Agency Effort to Control Wraparound Insurance Tax Shelters*, 25 VA. TAX REV. 129, 132-33 (2005) (analyzing hedge fund insurance “wrappers”); David S. Miller, *Distinguishing Risk: The Disparate Tax Treatment of Insurance and Financial Contracts in a Converging Marketplace*, 55 TAX LAW. 481, 540 (2002) (analyzing hedge fund reinsurance companies); Deborah H. Schenk, *An Efficiency Approach to Reforming a Realization-Based Tax*, 57 TAX L. REV. 503, 534 (2004) (analyzing the limitations of statutory approaches to prevent the manipulation of timing and character in hedge funds under the realization requirement). See also Jerald David August & Lawrence Cohen, *Hedge Funds—Structure, Regulation and Tax Implications*, 756 PLI/TAX 259, 263-64 (2007); Craig W. Foxgrover, *Offshore Hedge Funds, U.S. Banks, and Total Return Swaps: Finding a Path Other Than the Trade or Business Standard for U.S. International Tax Policy to Take in the World of Financial Derivatives* (unpublished manuscript, on file with author).

B. THE INCOME TAX IN A MODERN FINANCIAL WORLD: AN AGENDA

The lessons to be learned from the detailed examination of the income taxation of modern financial derivatives markets could have application well beyond the context of the taxation of financial speculators in derivative markets to the income tax system more generally. A growing body of literature has increasingly demonstrated imperfections in the modern financial markets, which cause their operations in the real world to depart from predictions in the efficient markets hypothesis.²⁰⁸ For example, the Black-Scholes pricing model, which revolutionized option pricing methodology and formed the basis of modern derivative markets,²⁰⁹ has rightfully dominated the literature on the proper taxation of derivative products.²¹⁰ One problem with this approach in the taxation literature is that it fails to recognize an open secret in the finance world— that Black-Scholes is wrong,²¹¹ or more specifically that at least one of the fundamental assumptions of the Black-Scholes model, constant volatility of the underlying asset, has been empirically proven to a near certainty to be incorrect in the operation of actual modern financial markets, at least since the stock market crash of 1987.²¹²

Taking this factor into account, under the approach outlined in this Article, the debate over the taxation of options and similar instruments such as swaps would need to be reframed to account for the reasons that buyers of liquid derivatives often pay significantly more or less for such derivatives than the price predicted by Black-Scholes and the impact on the government of this change in the risk-allocation mechanisms used in the real world. To the extent that such pricing anomalies reflect structural

208. See Jonathan Ford, *A Greedy Giant Out of Control*, PROSPECT, Nov. 2008, at 152, available at http://www.prospect-magazine.co.uk/article_details.php?id=10443; Ron Bird, Lorenzo Casavecchia & Paul Woolley, *Insights into the Market Impact of Different Investment Styles* (Paul Woolley Centre Working Paper, 2008), available at <http://www.business.uts.edu.au/qfrc/pwc/research/workingpapers/2008/wp1.pdf>. See generally Burton G. Malkiel, *The Efficient Market Hypothesis and Its Critics*, 17 J. ECON. PERSPECTIVES 59 (2003).

209. See Hu, *supra* note 15, at 1474-76.

210. See, e.g., Chason, *supra* note 52, at 138-39; David M. Hasen, *A Realization-Based Approach to the Taxation of Financial Instruments*, 57 TAX L. REV. 397, 402 (2004).

211. See, e.g., Hu, *supra* note 15, at 1478.

212. The Black-Scholes formula relies on arbitrage-free pricing theory by taking into account the factors relevant to the price of an option and then controlling for all variables other than the price, including the volatility of the underlying asset. See *supra* note 37. After the crash of 1987, finance theorists compiled empirical data on actual prices of options to insert into the formula to test the assumption regarding underlying asset volatility by making it the variable in the equation – what resulted was a “skewed” volatility depending on the term of the option, among other factors. See generally NEFTCI *supra* note 27. This is sometimes referred to as the “volatility smile” due to the shape of the implied volatility graph resulting from empirical pricing studies. See, e.g., Hu, *supra* note 15, at 1478; Wilmarth, *supra* note 73, at 343 n.536. Of course, the volatility of the underlying asset cannot be different for different options based on the term of the option, so the volatility smile must be a symptom of some other factor that Black-Scholes is failing to identify; regardless, the result is that the Black-Scholes predicted price alone, absent some modification, does not necessarily reflect actual trading prices. See generally JEAN-PIERRE FOUQUE ET AL. DERIVATIVES IN FINANCIAL MARKETS WITH STOCHASTIC VOLATILITY (2000).

imperfections in the pricing mechanism of particular derivatives markets,²¹³ the income tax could cause the government to bear some of these costs; such a result would require reconsideration not only of the income taxation of derivatives, but also the taxation of derivatives, and how they relate to their underlying assets, more generally. For example, perhaps the income tax law would be less concerned about the use of short-term put options on assets than other structured derivatives since the market seems to be able to charge a premium for such options as compared to the price predicted by Black-Scholes, thus providing less opportunity for such options to be used solely for tax manipulation purposes.²¹⁴ Any method of taxation of financial instruments that did not undertake such an approach could provide opportunities for financial engineers intimately familiar with the workings of the modern financial markets (with the assistance of increasingly clever tax advisors) to exploit such differences.²¹⁵

The same holds true in any area where modern risk management techniques are available that differ from, or exploit vulnerabilities in, theoretical models to multiply, diversify, allocate, or mitigate risk in the financial markets. These could include, among many others, the use of profits interests in partnerships as compensation,²¹⁶ the rise of publicly traded investment instruments such as “exchange-traded funds,”²¹⁷ and the growing influence of futures contracts on commodities prices.²¹⁸ As the world begins to internalize the lessons of the most recent credit crunch,²¹⁹ the need to incorporate the risk allocation mechanisms of modern finan-

213. This could be due, for example, to unexpected jumps in the price of the underlying asset, unanticipated volatility changes in the underlying asset, risk aversion in the behavior of purchasers, or other reasons. See, e.g., Andrea Buraschi & Jens Jackwerth, *The Price of a Smile: Hedging and Spanning in Option Markets*, 14 REV. FIN. STUDIES 495, 495-96 (2001); Sanjiv Ranjan Das & Rangarajan K. Sundaram, *Of Smiles and Smirks: A Term Structure Perspective*, 34 J. FIN. & QUANTITATIVE ANALYSIS 211, 211 (1999); S. G. Kou, *A Jump-Diffusion Model for Option Pricing*, 48 MGMT. SCI. 1086, 1086 (2002).

214. Alternatively, the premium could be thought of as a form of equity insurance, meaning the tax law could treat such options like insurance contracts as opposed to options priced more in accordance with Black-Scholes. Further, perhaps it would be possible to consider the premium paid in excess of the Black-Scholes predicted price as a deductible expense rather than as a “cost” of the option capitalized into the basis. These are not intended to serve as actual policy proposals, but rather examples of counter-intuitive policies that could arise from taking into account the operation of imperfect financial markets.

215. See, e.g., Knoll, *supra* note 11, at 200 (“[F]inancially sophisticated parties reduced their tax liabilities by using innovative financial products and techniques. . .”).

216. See, e.g., Fleischer, *supra* note 203, at 3-4.

217. See, e.g., Robert Hockett, *Just Insurance Through Global Macro-Hedging: Information, Distributive Equity, Efficiency, and the New Markets for Systemic-Income-Risk Pricing and Systemic-Income-Risk-Trading in a “New Economy,”* 25 U. PA. J. INT’L ECON. L. 107, 251-52 (2004); Peter N. Hall, Note, *Bucking the Trend: The Unsupportability of Index Providers’ Imposition of Licensing Fees for Unlisted Trading of Exchange Traded Funds*, 57 VAND. L. REV. 1125, 1129-30 (2004).

218. See, e.g., Andrew M. Pardieck, *Kegs, Crude, and Commodities Law: On Why It Is Time to Reexamine the Suitability Doctrine*, 7 NEV. L.J. 301, 302-04 (2007).

219. See, e.g., Brian Cheffins & John Armour, *The Eclipse of Private Equity*, 33 DEL. J. CORP. L. 1, 7 (2008); Etay Katz, *The Credit Crunch: The Regulatory Way Forward*, 2 LAW & FIN. REV. 234, 234 (2008).

cial instruments into the taxation literature becomes more pressing than ever. Any lessons learned should then be incorporated into crafting a more comprehensive approach to the taxation of financial instruments, including specific investigations into the broader considerations of the taxation of traders and dealers in such instruments and the cross-border implications, such as changes to holding periods or characterization of gains and losses, on a case-by-case basis.²²⁰

The closer the real world income tax can come to a normative income tax, in part by taking into account risk allocation mechanisms and structural imperfections in modern financial markets, the more tax planning opportunities in the real world can be minimized. In this manner, manipulation of the income tax through the use of financial engineering can be reduced, thus increasing the faith the general taxpaying public has in the long-term viability of the income tax.²²¹ This can be achieved not from arguing by analogy between the real world and the normative model, but by incorporating the lessons from the finance literature on the actual workings of the modern financial markets into the normative taxation models so as to more closely match the lessons that can be learned from these models and the financial transactions in the real world. By understanding and anticipating financial engineering in this manner, the income tax can survive even in the face of the virtually unlimited ability of modern capital markets to exploit arbitrage opportunities.

Such an undertaking falls to the legal literature, because of the comparative advantage of legal scholars to synthesize and apply the lessons learned from other disciplines so as to craft the mechanisms and institutions necessary to implement public policy.²²² As the debates over taxation of risk-based returns increase, whether in the context of cross-border capital markets, compensation of private investment funds, funding of public corporations, or privately negotiated transactions, the lessons that can be learned from this approach to taxation and risk become increasingly relevant to the long-term viability of the income tax in light of its perceived inability to handle the challenges of the modern financial world.²²³

220. For example, it may make sense to impose a mark-to-market and blended characterization regime to all derivatives traded on an exchange. *See, e.g.*, 26 U.S.C. § 1256 (2006).

221. *See, e.g.*, Victor Fleischer, *Taxing Blackstone*, 61 *TAX L. REV.* 89, 115-16 (2008).

222. That such an undertaking proves particularly challenging makes it more imperative, not less so. *See supra* note 12. This has actively begun in the securities and corporate literature. *See, e.g.*, *Decoupling I*, *supra* note 9, at 819-20; Hu, *supra* note 15, at 280-83; Huang, *supra* note 15, at 473-75; Stout, *supra* note 9, at 54-55; *see also* Robert J. Rhee, *The Effect of Risk on Legal Valuation*, 78 *U. COLO. L. REV.* 193, 195-96 (2007) (“[T]here is a ‘remarkable gap’ between scholarship in financial economics and legal bargaining. Only recently have scholars begun to bridge this gap.”).

223. *See, e.g.*, Avi-Yonah, *supra* note 200, at 20-22 (“[I]ncome taxation has an important symbolic value. . . . It is always hard to persuade the majority to pay their taxes when it is perceived that the wealthy minority do not pay theirs.”).

VI. CONCLUSION

This Article has begun the process of incorporating the lessons of the income taxation and risk literature into the analysis of the income taxation of financial derivatives, including the use of financial derivatives by financial speculators such as investment banks and hedge funds. By looking at the income taxation of derivatives traded on a liquid market through this lens, some remarkable conclusions arise. Under relatively conservative assumptions, the analysis demonstrates that the imposition of an income tax can result in the government effectively subsidizing certain financial speculators through the imposition of an income tax in a world with imperfect financial markets. This occurs solely as a function of the role of speculators in, and the risk allocation mechanisms of, modern liquid derivative markets, rather than any asymmetric or preferential tax rule regarding the treatment of derivatives or speculators.

This Article utilizes the income taxation and risk model to uncover the implicit efficiency and distributive costs in an income tax system with imperfect financial markets—costs currently missed or underappreciated—so that such costs can be taken into account in developing a comprehensive response to the taxation of financial markets. In response, this Article proposes the adoption of a derivatives trading tax, not as a supplement to or replacement for, but as an integral part of, the income tax regime to offset the costs of imperfect financial markets borne by the government through the income tax. Further, and perhaps more importantly, the approach to the taxation of risk in modern financial markets developed in this Article may prove an integral part of a newer and more nuanced understanding of income tax issues regarding financial markets more generally, potentially leading to a more effective, efficient, and equitable income tax system, both domestically and internationally.

APPENDIX

The following Appendix uses numerical examples to explain how the market signal malfunction and the distributional malfunction fit within the taxation and risk model.

PARADIGM: Absent an income tax, an investor wants to invest \$100 in a share of stock that has a 50% chance of paying \$130 and a 50% chance of paying \$90 in one year. Assuming the risk-free rate of return is 4%, the \$100 investment is guaranteed to return \$4. Thus, the risky portion of the investment must return \$26 if the bet wins or lose \$14 if the bet loses to return the total payoff.²²⁴

The investment has a risk-adjusted present value of \$6 because the investor has a 50% chance of earning \$26 and a 50% chance of losing \$14.

The General Equilibrium Model

The general equilibrium model of taxation and risk looks to the taxpayer, the government, and the market.²²⁵ Based on the Kaplow model, the starting point for an investor and the government is as follows:

$$(1) \text{ INVESTOR: } W = y[1 + r + a(x-r)]$$

$$(2) \text{ GOV: } R = T_0 [1 + r + \alpha(x-r)] + T_1$$

where W is the taxpayer's wealth, y is the taxpayer's earnings in period 1, r is the risk-free rate of return, x is the risky rate of return, a is the portion of y the taxpayer invests in risky assets, R is total government revenue at the end of period 1, T_0 is government revenue as of time zero, T_1 is period 1 government revenue, and α is the amount the government invests in risky assets.²²⁶ The model assumes that a and α represent optimal risk exposures for the investor and the government, respectively.²²⁷

Introducing an income tax into the Kaplow model results as follows:

$$(3) \text{ } W = y[1 + (1-t)r + (1-t)(ax-ar)]$$

where t is the tax rate. Under Domar-Musgrave, in response to the imposition of a tax, the taxpayer would borrow at the risk-free rate to increase the investment in the risky asset by $1/(1-t)$ as follows:

$$(4) \text{ } W = y[1 + (1-t)r + a(x-r) + rt - rt], \text{ or}$$

224. The numbers in this example are substantially similar to those used by Weisbach, *supra* note 4, partly for ease of comparison and partly for ease of calculation. See Weisbach, *supra* note 4, at 13. Regardless, the intuition provided by the simplified example is equally supported when applied more generally. See *id.*

225. See Kaplow, *supra* note 109, at 791.

226. *Id.* at 790-91.

227. *Id.*

$$(5) \quad W = y[1 + (1-t)r + a(x-r)]$$

Thus, the income tax reaches only the risk-free rate of return. The result holds if either the investor can borrow at the risk-free rate to purchase the risky asset (because $r_t - r_f = 0$), or if the investor can increase solely the risky portion of the return cost-free.

EXAMPLE 1: In light of the imposition of the tax, the investor increases the investment by 200% (1/.5). The investor does so by borrowing \$100 at the risk-free rate and investing the additional \$100 in a second share of stock. The government wants to borrow one share of stock and sell it for \$100 so as to “short” the risk-based position. The government can now serve as both the lender and the seller by borrowing one share from the taxpayer, lending the taxpayer \$100, and selling the taxpayer the risky asset for the \$100 loan.

In all circumstances, the taxpayer earns an \$8 risk-free return on the \$200 stock investment, and pays \$4 interest on the \$100 loan. The \$8 return is taxable at 50%, and the \$4 interest payment is deductible at 50%, resulting in a net return to the taxpayer of \$2 ($\$8 * 50\% - \$4 + \$4 * 50\%$). If the investor wins the bet, then the investor receives \$52 and owes the government \$26 in taxes. In this case, the investor would receive a net return of \$28. If the investor loses the bet on the risky investment, then the investor loses \$28 but receives \$14 from the government as a loss deduction, with a net effect of a loss of \$12. Compare this to the no-tax world, where the investor would have received a net of \$30 had the bet won (\$26 risky return plus the net \$4 risk-free return), or lost a net of \$10 (\$14 risky loss plus \$4 risk-free return) had the bet lost. As compared to the no-tax world, the world with an income tax in all circumstances results in the investor bearing a 50% tax on the initial \$4 risk-free rate of return, or \$2.

At maturity, the government will receive \$2 in taxes on the initial risk-free return on the investor’s stock investment of \$100 ($\$4 * 50\%$). The government is owed \$4 in risk-free return on the loan by the investor and owes \$4 in risk-free return to the investor on the stock it sold short, netting to zero. If the bet wins, the investor owes \$26 in taxes, but the government loses \$26 on its short sale, for a net of zero. If the bet loses, the government receives \$14 from the short sale, and owes the investor \$14 for the tax deduction from the loss. Thus, in all circumstances, the government collects only \$2 of taxes, or the tax on the risk-free return on the original \$100 investment. This can be demonstrated as follows:

$$(6) \quad T_1 = [yrt - yr + yr + aytx - aytx], \text{ or}$$

$$(7) \quad T_1 = yrt$$

Borrowing Costs

EXAMPLE 2: Assume that C is long \$100 in the risky asset. In light of the 50% tax, A wishes to double the bet in the risky asset. Rather than engage in a circular cash flow transaction with the government, A prefers to purchase the \$100 risky asset from C, since A incurs substantially lower transactional costs to do so.²²⁸ A could purchase the risky asset from C for \$100, borrowing the \$100 from C to make the purchase from C, in much the same way as with the government in Example 1. The interest on the loan from C to A is 8%, reflecting both the risk-free return of 4% plus a risk-premium of 4%.

As in the case of the risk-free rate, the government remains neutral with respect to the interest charge, because the value of the 8% deduction to A will be exactly offset by the 8% interest income to C. As to A, the 4% risk premium represents double the borrowing cost of the risk-free rate, resulting in A bearing double the tax liability than if A could borrow at the risk-free rate of return.²²⁹ From equation (5), this can be represented as:

$$(8) \quad W=y[1 + (1-t)r + a(x-r) + rt - bt]$$

where b is the investor's borrowing rate. This result, arising due to the cost of borrowing, is where the derivative market becomes attractive as an alternative.

Derivatives as Coin Flips

EXAMPLE 3: Assume an investor A wishes to make a \$100 investment in the risky asset absent taxes. The government imposes a 50% tax. To mitigate the tax, A must double the size of the investment. Due to transaction costs and borrowing costs, A desires to double the size of the investment by purchasing a derivative long in the investment for \$100, rather than borrowing \$100 and investing the additional \$100 in the risky asset. Because of the offsetting obligations of the derivative, no upfront cash payment is required. The counterparty to the derivative contract is B, whose borrowing rate is the risk-free rate.

For B to accept the short position in the derivative, B must hedge the short risk position by purchasing the asset long, which leads to an increased price for the asset as compared to the price prior to the introduc-

228. If both A and C wish to mitigate the tax through doubling their investment, each could engage in a transaction substantially similar to that in Example 1, with the effect of mitigating the tax on the risky element, the government having zero exposure to the risky asset, and a net tax of fifty percent on the risk-free return on the risky assets of both A and C. If transaction costs are involved, however, this may not be a realistic alternative as each would have to engage in identical transactions with the government rather than deal once with each other.

229. See Cunningham, *supra* note 92, at 37-39 for an example.

tion of the income tax. This increase in price serves as a signal to the government that it must have accepted some net portion of the exposure to the risky asset in imposing the tax. To mitigate this risk, the government borrows the risky asset from A and sells it short to B, using the proceeds to finance a risk-free loan to B. B uses the loan to purchase the asset. The government will have fully mitigated its implicit risk position imposed through the income tax and will have satisfied the market demand for the asset by doubling the supply of the asset through a short sale in response to the doubling of the demand for the asset by B. This can be represented as:

$$(9) \quad W=y[1 + (1-t)r + (1-t)(ax-ar) + tx]$$

Unlike in (5), under (9), by permitting the investor to increase the bet without an initial outlay of cash, the derivative mitigates the tax on the entire return on the risky asset, including the initial risk-free return. This is not realistic, since B incurred the risk-free rate to hedge and thus would have passed this cost on to A as part of the transaction, but it serves a useful illustrative function.²³⁰

Under this scenario, if A wins the bet, then A wins \$60, and pays \$30 to the government in taxes. The government loses \$30 on the short, and has a net of zero on the risky portion of the investment. B wins \$30 from the government, and loses \$30 to A, for a net of zero on the risky portion. Thus, none of the return is taxed under the Domar-Musgrave theorem, the government remains indifferent, and the market price returns to equilibrium.

Market Signal Malfunction

EXAMPLE 4: In addition to the facts in Example 2, assume that A, instead of purchasing the \$100 risky asset from C, prefers to double the risky bet through the use of a derivative with C, and they enter into a \$100 derivative contract with respect to the risky asset.

With respect to A and C, the results are substantially similar to those described above. The two primary differences are: (1) A does not incur any up-front borrowing costs, and (2) A now holds two distinct risky assets, the initial risky investment and a derivative on the initial risky investment. This can be represented as:

230. In reality, B would have required A to pay the spot price of the asset plus time value for the derivative, but simplifying the numbers does not impact the analysis and has been used in the literature to similar effect. See David M. Schizer, *Executives and Hedging: The Fragile Legal Foundation of Incentive Compatibility*, 100 COLUM. L. REV. 440, 490 n.202 (2002) ("Although I use \$900,000 in the text for the sake of simplicity, the price should be higher because forward prices generally equal the spot price plus an amount based on time value."). Such additional costs act in much the same manner as borrowing costs or other transaction costs, and thus cause distributive concerns, but can be disregarded solely for purposes of demonstrating the effect of default risk on the tax on risky returns in derivatives.

$$(10) \quad W=y[1 + (1-t)r + (1-t)(ax-ar) + txd]$$

where d is the risk that the counterparty will not default if $x>0$, and d is 1 when $x<0$.

In the case of A entering into a derivative with a hedging investor such as C, the derivative investment substantially replicates owning the underlying risky asset, since payment on the derivative will always be satisfied out of C's investment. Thus, d is equal to 1 in all circumstances, resulting in a return to Equation (9). Similarly, to the extent A quantifies d and discounts the price of the derivative accordingly, the formula also returns to Equation (9).

The analysis with respect to the government changes slightly. If A wins the bet, then A wins \$52 and pays \$26 to the government. C loses and pays \$26 to A but wins \$26 on the underlying asset, for a net of zero. The government earns \$26 in tax, effectively enjoying 50% of the initial risky assets in the market (that is, both A's and C's initial investment). Similarly, if A loses the bet, then A loses \$28, and receives \$14 from the government, while C continues to net to zero. The government has a net loss of \$14, effectively bearing 50% of the initial risky assets in the market (both A's and C's). Thus, although A effectively mitigated the tax, the government did not return to equilibrium. From equation (6), this can be represented as:

$$(11) \quad T_1 = yrt + aytx - aytxm$$

where m is the extent of the market signal and $0 \leq m \leq 1$. If $m=1$, then Equation (11) equals Equation (7), and the government collects tax on the risk-free return only. If $m<1$, the government's exposure to x is greater than α , a suboptimal result.

Market Signal and Distributional Malfunction

EXAMPLE 5: Assume that A wishes to double the bet in the risky investment due to the imposition of the income tax, and seeks to use the derivatives market to reduce the transaction and borrowing costs of doing so. Rather than enter into a derivative with B (a market maker) or C (a hedger), A enters into the derivative with D, a speculator.

D, acting as a pure speculator, has no assets or income with which to pay the derivative if it loses; rather, D is gambling that the derivative will win. As a result, A no longer holds two identical risky investments. Instead, A owns \$100 of the initial risky investment plus a derivative on the risky investment that is subject to D's default risk. Under this scenario, if A loses, then A loses \$28 and receives \$14 from the government, while D wins \$14 and owes \$7 to the government, for a net loss of \$14 to A and \$7 to the government. If A wins then, as before, A wins \$26 on the underlying risky asset and is owed \$26 on the derivative. The difference is that A

does not receive the \$26 from D, since D has no assets with which to pay. Thus, A receives only \$26 pre-tax, and pays \$13 to the government, for a net gain of \$13 to A. D defaults, and thus does not make any payment to A, but also does not receive any payment from the government. As in equation (10), this can be represented as:

$$(12) \quad W=y[1 + (1-t)r + (1-t)(ax-ar) + txd]$$

but where $d=0$ when $x>0$. The value of d establishes the extent to which the investor successfully mitigates the tax, at least on a risk-adjusted present value basis. To the extent d could be priced, this would not be problematic. Default risk is difficult to accurately price,²³¹ however, and in liquid derivatives markets, d is structurally not completely priced.²³²

With respect to the government, assuming A wins the bet, A wins \$52, and pays \$26 to the government, while D loses \$26, and receives \$13 from the government. Conversely, if A loses the bet, then A loses \$28 and is owed \$14 by the government, and D wins \$14 and owes \$7 to the government. Because the counterparty D is a pure speculator, there is no increased demand in the market, and thus the market signal malfunction remains.²³³ Thus, the government will continue to bear the risk of a \$100 investment in the risky asset through the imposition of the income tax, since it will win \$13 or lose \$7 in all circumstances.

The net result for the government is to bear half of the risk on the initial investment in the risky asset due to the market signal malfunction—the same result as if A had not entered into any Domar-Musgrave transaction. Rather than result in a circular cash flow, in which both A and the government either win \$13 or lose \$7, respectively, as partners in the risky investment, by imposing the income tax, the government effectively *transfers* \$7 of value from A to D. This has a positive risk-adjusted present value to D, as compared to the pre-tax world.

The identical result can be demonstrated through a slightly modified version of the example described above.

EXAMPLE 6: Assume A doubles the \$100 bet in the risky investment through a derivative with C (a hedging investor), and as a result, the government continues to bear half of the investment risk on both A's and C's initial risky investment. For simplicity, assume no market signal malfunction, but assume transaction costs which prevent circular transactions between the government and either A or C. The government thus enters into a \$200 short position in the risky asset through a derivative with E, a pure gambling speculator.

231. See Jarrow & Turnbull, *supra* note 29, at 53-54; Herb Johnson & René Stulz, *The Pricing of Options with Default Risk*, 42 J. FIN. 267, 267 (1987).

232. See Mozumdar, *supra* note 33, at 222.

233. Of course, to the extent that D hedged, the market signal would return.

If the government loses on the derivative, it owes a net \$26 to E, which is offset by the \$26 long exposure it has in the initial risky assets through the imposition of the income tax, and thus the government has a net of zero. If the government wins on the derivative and E pays, then the government wins a net of \$14 from E and loses on its long exposure in the initial risky assets through the imposition of the income tax, also resulting in a net of zero. If the government wins on the derivative and E defaults, however, the government receives nothing from E, but it continues to bear the loss from its exposure to the initial risky assets through the imposition of the income tax, resulting in a net loss of \$14. This can be represented as:

$$(13) \text{ INVESTOR: } W=y[1 + (1-t)r + (1-t)(ax-ar) + txd_C]$$

$$(14) \text{ GOV: } T_1 = yrt + aytx - aytxd_E$$

where d_C is the default risk of C and d_E is the default risk of E. Generalizing and combining with equation (11) results in:

$$(15) \text{ GOV: } T_1 = yrt + aytx - aytxdm$$

such that if $m=1$ and $d=1$, the government returns to Equation (7), but if either $m<1$ or $d<1$, or both, the government bears sub-optimal exposure to x .