Credit Derivatives, Leverage, and Financial Regulation's Missing Macroeconomic Dimension

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INTRODUCTION

Both policymakers and scholars have placed considerable blame for the Panic of 2008 – the global financial crisis that reached full strength in that year – on over-the-counter ("OTC") derivatives.[2] In turn, legislative and policy responses to the crisis, such as the Dodd-Frank Act,[3] have introduced a host of new restrictions on these particular financial instruments. Among other things, the Dodd-Frank Act prohibits future federal government bailouts of certain entities that trade in derivatives,[4] requires the central clearing of many derivatives,[5] and authorizes federal regulators to set new collateral requirements for derivatives that are exempted from those central clearing requirements.[6]

Yet, an analysis of both the role of derivatives in the financial crisis and the new rules governing derivatives, must avoid painting with too broad a brush. Several misconceptions threaten to confuse both the most serious risks posed by derivatives and the regulatory response. This article argues that a certain species of derivatives – credit derivatives – pose particular concerns because of their ability to increase leverage throughout the financial system. Credit derivatives are a form of derivative, whose value is based on the credit risk[7] of another firm or

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[2] *See, e.g.*, Karl S. Okamoto, *After the Bailout: Regulating Systemic Moral Hazard*. 57 UCLA L. Rev. 183, 196-203 (2009) (blaming failure of Bear Stearns, Lehman Brothers and AIG on credit default swaps); [other cites]

For a contrary view that credit derivatives did not play a significant role in the crisis, *see* Rene M. Stulz, *Credit Default Swaps and the Credit Crisis*, 24 J. ECON. PERSP. 73 (2010).

[3] Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. 111-203 (2010)[hereinafter Dodd-Frank Act].

[4] [Dodd-Frank Act § 716.]

[5] [Dodd-Frank Act § 723(a)(3).] The mechanics and rationale of central clearing of derivatives is explained in further in Part IV.a *infra*.

[6] [Dodd-Frank Act § 723(a)(2) *adding* 7 U.S.C. 2(h)(4(B)(iii)] The explicit function and the unexplored potential macroeconomic effects of this new authority is discussed in Part IV.a. *infra*.

[7] Credit risk represents the risk to a firm or person that a borrower or other obligor will default on payment of obligations to it. Credit risk includes counterparty risk in derivative transactions, i.e., the risk that a counterparty which has contractual obligations to make payment to an institution (upon an event specified in the derivative contract) will not perform those obligations. JOËL BESSIS, RISK MANAGEMENT IN BANKING 12-13 (2d ed. 2002). Bessis notes that credit risk also covers the decline in the credit standing of an obligor, or bonds or stock held by the

financial instrument.[8] However, the full economic consequences of the increased leverage from credit derivatives are often themselves not fully fleshed out. Many commentators have focused on how increased leverage, whether stemming from credit derivatives or otherwise, magnifies the fragility of financial institutions.[9] To be sure, excessively leveraged financial institutions represent an important concern. Moreover, by linking one financial institution to another, credit derivatives can increase counterparty risk, or the risk of one party to a financial transaction defaulting on its obligations.[10] The web created by financial institutions entering into complex credit derivatives with one another in series raises the specter of leveraged institutions falling like dominoes.[11] The potential chain reaction of failing banks and other financial firms represents one form of system risk.[12] It was this scenario that supposedly animated the extraordinary federal bailout of the insurance giant AIG, which had underwritten hundreds of billions of dollars in credit derivatives that proved guarantees to other large financial institutions.[13] The looming failure of the firm left a myriad of other financial institutions with enormous exposure.[14]

Yet this potential domino effect of counterparty risk is but one side of the coin of the consequences of credit derivatives and their ability to create leverage. What the above analysis, however briefly summarized, fails to capture are the macroeconomic effects of credit derivatives. This article aims to move beyond the analysis of the counterparty risk of derivatives to explore these macroeconomic effects. By allowing financial institutions – those institutions that borrow to lend – to increase leverage, credit derivatives can operate to increase the overall amount of

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institution even short of default, as this decline "triggers an upward move of the required market yield to compensate [for] the higher risk and triggers a value decline" of the security. *Id.*

[8] MICHAEL DURBIN, ALL ABOUT DERIVATIVES 61 (2007). *Compare* Frank Partnoy & David A. Skeel, Jr., *The Promise and Perils of Credit Derivatives*, 75 U. CIN. L. REV. 1019, 1021 (2007) (defining credit derivative as "financial instruments whose payoffs are linked in some way to a change in credit quality of an issuer or issuers").

[9] Cite.

[10] For an economic analysis of the effects of counterparty risk on the pricing of derivatives and other complex financial instruments, see generally Robert A. Jarrow & Fan Yu, *Counterparty Risk and the Pricing of Defaultable Securities*, 56 J. FIN. 1765 (2002). *See also* BESSIS, *supra* note 7, AT 499-504 (discussing credit risk in the context of derivatives).

[11] *See* Franklin Allen & Elena Carletti, *Credit Risk Transfer and Contagion*, 53 J. MONETARY ECON. 86, __ (2006) (providing model of how credit risk transfers, including via credit derivatives, can increase contagion of financial shocks).

[12] George G. Kaufman & Kenneth E. Scott, *What is Systemic Risk, and Do Bank Regulators Retard or Contribute to It*, 7 INDEP. REV. 371, __ (2003). For an analysis of the systemic risk posed by derivatives written over a decade before the Panic of 2008, *see* Kimberly D. Krawiec, *More Than Just New Financial Bingo: A Risk-based Approach to Understanding Derivatives*, 23 J. CORP. L. 1 (1997).

[13] William K. Sjostrom Jr., *The AIG Bailout*, 66 WASH. & LEE L. REV. 943, __ (2009). As of December 31, 2007, AIG had outstanding obligations to provide credit protection for certain senior asset-backed securities totaling US$527 billion (in notional value). *Id.* at 955.

[14] *Cf. id.* at 977-83 (analyzing both stated premises of bailout and commentary questioning these premises.)

liquidity in financial markets.[15] This increase in liquidity can be thought of as increasing the overall supply of money in a market, which can have a number of significant economic effects. By increasing leverage and liquidity, credit derivatives can fuel rises in asset prices and even bubbles.[16] Rising asset prices can then mask mistakes in pricing credit derivatives and in assessing the risk of leverage in the financial system.[17] Furthermore, the use of credit derivatives by financial institutions can contribute to a cycle of leveraging and deleveraging in the economy.[18]

This article seeks to explore and outline these macroeconomic effects of credit derivatives. In so doing, this article also argues for viewing many of the policy responses to credit derivatives, such as requirements that these derivatives be exchange-traded, centrally cleared or otherwise subject to collateral or "margin" requirements, in a second, macroeconomic dimension. These rules would affect not only counterparty risk and the safety and soundness of financial institutions, but also would have subtler, but significant macroeconomic effects. These rules have the potential to change the amount of liquidity and supply of credit in financial markets and in the "real" economy. Moreover, what is true for credit derivatives applies equally to other financial instruments and regulations (ranging from bank capital requirements to requirements that lenders retain part of the loans they securitize) that can alter the leverage of financial institutions. By examining credit derivatives, this article illustrates the need to see a wide array of financial regulations in a macroeconomic context.

Understanding these macroeconomic effects also reveals a number of implications for regulatory design. First, regulations that address financial institution leverage offer central bankers new tools to dampen inflation in asset markets and to fight potential asset price bubbles.[19] Second, even if these regulations are not used primarily as monetary or macroeconomic levers, changes in these regulations, including changes in the effectiveness of these regulations due to regulatory arbitrage, can have profound macroeconomic effects.[20] Third, the macroeconomic dimension of credit derivative regulation and other financial regulation argues for a need for greater coordination between prudential regulation and macroeconomic policy. In providing concrete examples of how prudential regulation can have effects on the macroeconomy, this article fits into the burgeoning literature on "macroprudential regulation."[21] Effective coordination, in turn, requires further integration in the academy of the

[15] *See* Part III.a. *infra*.
[16] *See* Part III.b. *infra*.
[17] *See* Part III.c. *infra*.
[18] *See* Part III.d. *infra*.
[19] *See* Part IV.b. *infra*.
[20] *See* Part IV.b. *infra*.
[21] This somewhat inchoate term captures a growing movement that argues that traditional prudential regulation, which focuses on the safety and soundness of individual financial institutions, may not adequately address (and may

study of financial regulation and macroeconomics. Coordination also requires greater consideration of macroeconomics in the legal academy.[22]

This article proceeds as follows. Part I describes how credit derivatives function and how they can increase leverage. This Part summarizes scholarship on how leverage can lead to counterparty risk and domino failures of financial institutions and outlines criticisms of credit derivatives that represent "pure bets." Part II then argues that a second category of credit derivatives, those in which at least one party to a derivative is hedging a preexisting credit risk,

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even exacerbate) threats to the stability of financial markets as a whole. For a primer on macroprudential regulation, *see* Gabriele Galati & Ricchild Moessner, Macroprudential Policy – a Literature Review, BIS Working Paper No. 337 (Feb. 2011) *available at* http://www.bis.org/publ/work337.pdf.

[22] The study of law and economics tends to ignore macroeconomics, with a few notable exceptions in legal scholarship. A handful of legal scholars have previously called for a greater examination of the macroeconomic effects of securities laws and other financial regulation. The focus of the academic work described below differs from the focus of this article on leverage, liquidity, and monetary policy.

Professor Steven Ramirez has argued that financial regulation plays a vital role in macroeconomic stability by promoting investor confidence. Steven A. Ramirez, *Fear and Social Capitalism: the Law and Macroeconomics of Investor Confidence*, 42 WASHBURN L.J. 601 (2002). He has also examined how the New Deal introduced various legal institutions designed, directly or indirectly, to bolster national economic output and other macroeconomic goals. Professor Ramirez includes in this analysis: Steven A. Ramirez, *The Law and Macroeconomics of the New Deal at 70*, 63 MD. L. REV. 515 (2003).

A number of other legal scholars have shared Professor Ramirez's vision of a macroeconomic approach to law as an antidote to the perceived orthodoxy of microeconomic approaches to law. These scholars often write in a more philosophical and idealistic vein about finding a macroeconomic approach to law and regulation to achieve broader social goals. *See, e.g.*, Mark Kelman, *Could Lawyers Stop Recessions? Speculations on Law and Macroeconomics*, 45 STAN. L. REV. 1215 (1993) (positing that law and legal interventions might provide a corrective to recessions and the resultant higher unemployment and economic "misallocation."); Douglas A. Kysar, *Sustainability, Distribution, and the Macroeconomic Analysis of Law*, 43 B.C. L. Rev 1 (2001) (framing macroeconomic approach in terms of promoting environmental sustainability).

Other legal scholars have written on more concrete themes of the legal institutions involved in macroeconomic policy making. For example, a number of scholars have written on the laws affecting central banks, bank regulators, and monetary policy generally. *See, e.g.*, Heidi Mandanis Schooner, *The Role of Central Banks in Bank Supervision in the United States and the United Kingdom*, 28 BROOKLYN J. INT'L L. 411 (2003) (analyzing compatibility of monetary policy and prudential supervision roles of central banks and the legal structures supporting these twin roles). Some of this scholarship on macroeconomic (and particularly monetary) legal actors adopts a more critical perspective. *See* Timothy A. Canova, *Lincoln's Populist Sovereignty: Public Finance Of, By, and For the People*, 12 CHAPMAN L. REV. 561 (2009) (arguing for greater popular control of macroeconomic policy). Another strand of scholarship on monetary policy looks at the architecture of the international financial system, such as the International Monetary Fund. [Cites]

Still other scholars have written about the macroeconomic dimension of law while analyzing the legal architecture of fiscal policy. *See, e.g.*, Kate Stith, *Rewriting the Fiscal Constitution: The Case of Gramm-Rudman-Hollings*, 76 CALIF. L. REV. 595 (1988) (examining statutory regime designed to constrain federal spending); Neil H. Buchanan, *Social Security, Generational Justice, and Long-Term Deficits*, 58 TAX L. REV. 275 (2005) (analyzing shortfalls in Social Security, effects of federal budget deficits, and tax policies).

Another line of inquiry focuses on how macroeconomic conditions can affect legal decision-makers. *See, e.g.*, Nancy C. Staudt, *The Macroeconomic Court: Rhetoric and Implications of New Deal Decisionmaking*, 5 NW. J. L. SOC. POL'Y __ (2010) (arguing that macroeconomic conditions influenced statutory interpretation by judges in early 20th century notably in New Deal Supreme Court).

poses a different kind of danger. These hedging credit derivatives can increase leverage and liquidity throughout financial markets, all the way back to consumer and commercial lending markets in the "real" economy. Hedging credit derivatives represent an important strand in the "shadow banking system," a network of financial institutions and instruments – including asset-backed securities – that grew in the last three decades to link borrowers to investors in capital markets.[23] The shadow banking system provides the same credit function as traditional lending by depository banks, but bypasses many of the regulatory costs on those banks.[24] Part III outlines the macroeconomic effects that these hedging credit derivatives can have, including increasing overall liquidity in financial markets, contributing to asset price booms and even bubbles, and magnifying leverage cycles. Part IV then discusses some of the implications of this macroeconomic dimension to credit derivatives for policy and scholarship.

I. CREDIT DERIVATIVES, COUNTERPARTY RISK, AND THE CREATION OF LEVERAGE

As mentioned above, credit derivatives represent financial instruments whose value is based on the credit risk of a firm or another financial contract. Although credit derivatives come in forms as varied and complex as financial wizards can conjure, the basic economics can be understood through a common variant, the credit default swap ("CDS"). In a simple cds, one party (called the "credit protection buyer") pays a premium to another party (the "credit protection seller") in exchange for the credit protection seller making specified payments to the credit protection buyer should a specified "credit event" occurred. For example, the credit protection seller might agree to make payments to the buyer should a payment default occur on specific bonds or other financial instruments. A cds thus functions as kind of financial guarantee or "insurance" on those bonds, except that the cds contract is not regulated as insurance thanks to the craft and lobbying of the lawyers who devised this type of instrument.[25]

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[23] This definition of shadow banking meshes with that used by Tobias Adrian and Hyun Song Shin. *See* Tobias Adrian & Hyun Song Shin, *The Shadow Banking System: Implications for Financial Regulation*, Fed. Res. Bank N.Y. Staff Report No. 382 (July 2009) *available at* http://www.newyorkfed.org/research/staff_reports/sr382.pdf. *See also* Zoltan Pozsar et al., *Shadow Banking*, Fed. Res. Bank N.Y. Staff Report No. 458 (July 2010) *available at* http://www.ny.frb.org/research/staff_reports/sr458.pdf.

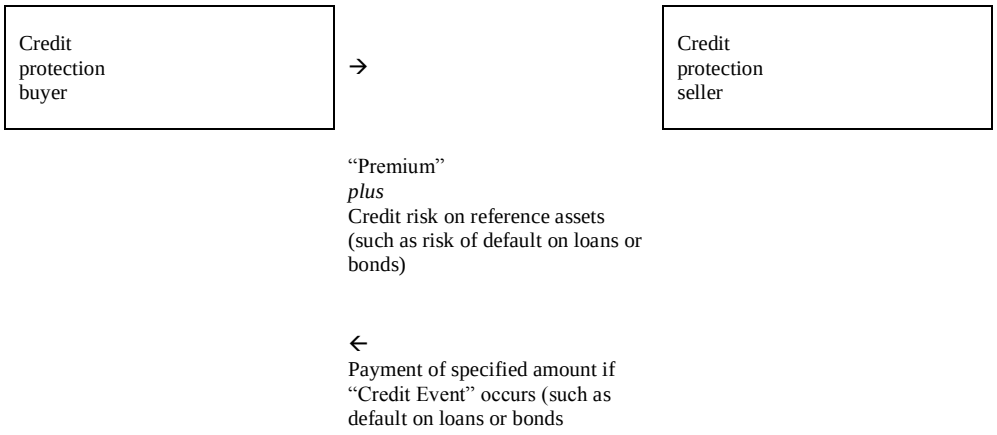
The term "shadow banking" has entered the popular lexicon and may have broader definitions, such as any unregulated system of credit that provides an alternative to bank lending. *Cf.* Paul Krugman, *Out of the Shadows*, N.Y. Times June 18, 2009, at A27 (arguing financial reform efforts fail to address "parallel financial system" of "largely unregulated institutions").

[24] *See* Erik F. Gerding, *The Shadow Banking System and Banking Law at Twilight*, (Jan. 2011) (unpublished manuscript on file with the author).

[25] *See* Robert F. Schwartz, *Risk Distribution in the Capital Markets: Credit Default Swaps, Insurance and a Theory of Demarcation*, 12 FORDHAM J. CORP. FIN. L. 167, 181-88 (2007) (describing history of lawyers and insurance regulators grappling with whether cdss should be regulated as insurance products). For an argument that credit derivatives do not constitute, and should not be regulated as, insurance, *see* M. Todd Henderson, *Credit Derivatives are not "Insurance"*, 16 CONN. INS. L.J. 1 (2009).

Diagram A below depicts the basic economics of this simple cds example:

Diagram A



a. Hedging versus Pure Bet Derivatives

This simple cds example can also illustrate the distinction between two types of credit derivatives. In the first type of derivative, the credit protection buyer uses the cds to hedge a credit risk that the buyer is already bearing. For example, the credit protection buyer may purchase credit protection to "insure" against the risk of default by bonds in its portfolio. This article refers to this type of credit derivative as a "hedging" derivative. Hedging derivatives, like insurance policies offer possible economic efficiencies by allocating credit risk to parties that are either able to spread the risk widely or otherwise bear the risk more efficiently.[26]

In the second type of derivative, the credit protection buyer has no preexisting credit risk, nor does the credit protection seller. Following the above hypothetical, the credit protection buyer purchases a credit default swap on various bonds *but neither owns those bonds nor would suffer a loss should those bonds default.* The credit protection buyer enters into the contract to speculate that the bonds would default and that the expected (present) value of the payment from the credit protection seller will exceed the premium it pays. The credit protection buyer makes a equal and opposite gamble that the premium it receives outweighs the present value of its expected payout under the contract. The contract is a zero sum game, and this article labels this second form a "pure bet" credit derivative. The zero sum nature of pure bet credit derivatives (and other derivatives in which neither party is hedging a risk) has attracted criticism of these contracts from a number of scholars. Law professor Lynn Stout argues that this form of credit

[26] Ronald J. Gilson & Charles K. Whitehead, *Deconstructing Equity: Public Ownership, Agency Costs, and Complete Capital Markets*, 108 COLUM. L. REV. 231, __ (2008).

derivative represents a form of gambling, which cannot have a net positive social value because of its zero sum nature.[27]

b. Counterparty Risk

Even though these contracts are theoretically zero sum, Professor Stout argues these speculative contracts can in fact have negative consequences by creating needless counterparty risk, or the risk of one of the parties, such as the credit protection seller, unexpectedly defaulting on its payment obligations under the contract.[28] This concern about counterparty risk features prominently in scholarship on credit derivatives and OTC derivatives generally.[29] A default under the contract may stem from the credit protection seller miscalculating its expected liability under the contract (for example by miscalculating the probability of a credit event occurring) and thus mispricing the premium (or price) of the derivative contract. A failure to predict the default of the credit protection seller may, in turn, lead to significant financial losses for the credit protection buyer.

These losses may be magnified system-wide because pure bet credit derivatives can themselves be hedged with hedging credit derivatives. In other words, a credit protection seller in a pure bet derivative may hedge the risk of paying under this contract, by purchasing a second credit derivative (and becoming a credit protection buyer) from a third party credit protection seller (Party C in the diagram below). This third party can itself hedge its risk of making payment under the second credit derivative contract by purchasing credit derivative protection from a fourth party (Party D in the diagram below). Rinse, lather, repeat. This (relatively simple) example, depicted below in Diagram B, demonstrates how credit derivatives can connect together in chains of credit risk transfers.

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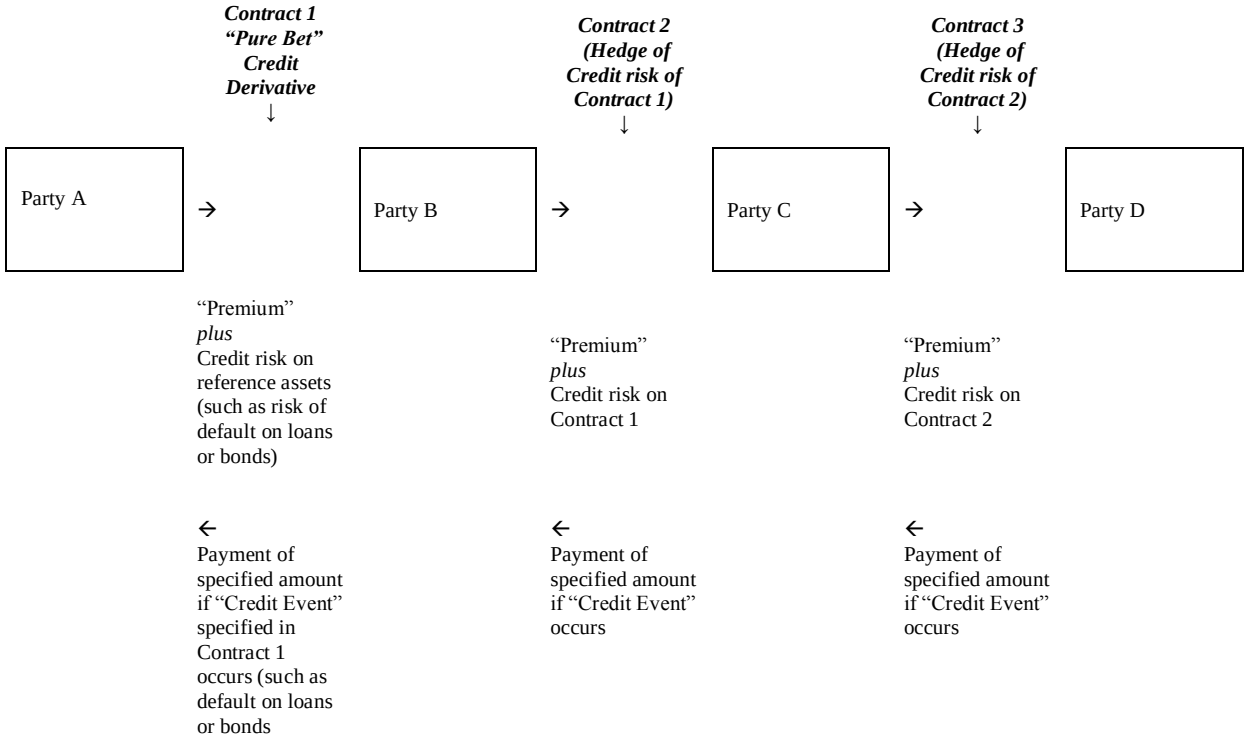
[27] Lynn A. Stout, *Why the Law Hates Speculators: Regulation and Private Ordering in the Market for OTC Derivatives*, 48 DUKE L. J. 701 (1999). Professor Stout argues that these pure bet derivatives were unenforceable gambling contracts under common law principles because neither party had an "insurable interest." *Id.* at __. She criticized legislation including the U.S. Commodities Futures Modernization Act of 2000, Pub. L. No. 106-554, 114 Stat. 2763, and the U.K. Financial Services Act 1986, c. 60 (Eng.) (*repealed by* The Financial Services and Markets Act 2000, c. 8), which overrode this common law rule in the United States and United Kingdom respectively. Lynn A. Stout, *Regulate OTC Derivatives by Deregulating Them*, REGULATION 30, 32 (Fall 2009).

[28] *Id.* at __.

[29] *See, e.g.,* Krawiec, *supra* note 12, at __.

Diagram B



Furthermore, credit protection buyers (like Party A in the above diagram) concerned with the counterparty risk of their credit protection sellers (Party B in the above diagram), can use credit derivatives to hedge this risk. Indeed, simple chains of credit risk transfers, like the one depicted above, can link together to form complex webs. Unexpected defaults in any contract can cause unexpected financial losses to cascade throughout the web.[30]

Of course, counterparties can attempt to calculation the risk of a default earlier in the chain (or elsewhere in the web) and either appropriately price their sales of credit protection or hedge the risk appropriately. Yet, the longer the chain (or more complex the web) of credit derivative contracts, the more difficult these calculations become.[31] This difficulty stems in part from the tendency of information on underlying credit risk to deteriorate with each credit risk transfer.[32]

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[30] **Cite.**

[31] *See* Joshua Coval et al., *The Economics of Structured Finance*, J. ECON. PERSP.,3, [23] (2009).

[32] Party D in the example above may need information about the credit risk not only of Party C, but also of Part B. Moreover, it may need to assess the risk of a credit event occurring under Contract 1, such as a default on certain bonds. The incentives of parties earlier in the chain to pass on this information may be weak. Even with proper incentives, information can be garbled as it passes through long chains, as in the children's game of telephone.

Parties might take several analytic shortcuts to avoid having to gather information on credit risk at each earlier stage in the chain. They might rely on credit rating agency ratings to measure credit risk. However, many scholars have sharply criticized the performance and incentives of rating agencies before and after the Panic of 2008.[33] Parties might also rely on the ability of parties earlier in the chain to appropriate price credit risk transfers. However, those parties may lack appropriate incentives to price credit risk accurately if they can hedge and unload that risk on other parties. Moreover, economists have demonstrated that in the case of risk transfer chains such as securitization or credit derivatives, small mistakes in pricing risk at the beginning of the chain are magnified with each subsequent transfer of risk.[34]

To complete the circle, improper pricing of credit risk means that a default on one credit derivative may ripple and cascade through a web of interconnected derivative contracts. Through this chain reaction of falling dominoes, counterparty risk can transform into systemic risk. Lynn Stout raises this concern to argue that pure bet derivatives should not be legally enforceable contracts.[35]

c. *Leverage*

The financial damage from counterparty defaults can increase exponentially to the extent that the parties to a derivative contract are leveraged. Per introductory corporate finance, leverage both magnifies potential gains and potential losses for firms that invest with borrowed money.[36] Leverage can enter the credit derivatives system in two ways. First, firms can borrow money from outside the system, whether by loan agreements, accepting deposits from customers (in the case of bank), or by borrowing using other financial instruments. For example, a number of financial institutions dramatically increased their short-term borrowings over the last two decades through repurchase (repo) agreements.[37]

Gerding, *supra* note __, at 175; Willem H. Buiter, *Lessons from the 2007 Financial Crisis*, CENTRE FOR ECONOMIC POLICY RESEARCH POLICY INSIGHT NO. 18, 3-4 (Dec. 2007) *available at* http://www.cepr.org/pubs/PolicyInsights/PolicyInsight18.pdf.

[33] *See e.g.*, John Patrick Hunt, *Credit Rating Agencies and the 'Worldwide Credit Crisis': The Limits of Reputation, the Insufficiency of Reform, and a Proposal for Improvement*, 2009 COLUM. BUS. L. REV. [1]; Frank Partnoy, *How and Why Credit Rating Agencies are Not Like Other Gatekeepers, in* FINANCIAL GATEKEEPERS: CAN THEY PROTECT INVESTORS? 59 (Yasuuki Fuchita & Robert E. Litan eds., 2006); *See* Frank Partnoy, *The Siskel and Ebert of Financial Markets?: Two Thumbs Down for the Credit Rating Agencies*, 77 WASH. U. L.Q. 619 (1999);

[34] *See* Coval et al., *supra* note 31, at [23].

[35] Stout, *Regulate OTC Derivatives by Deregulating Them*, *supra* note 27, at 33.

[36] William A. Klein et al., BUSINESS ORGANIZATION AND FINANCE: LEGAL AND ECONOMIC PRINCIPLES 343-46 (11th Ed. 2010).

[37] Tobias Adrian & Hyun Song Shin, *Liquidity and Leverage*, 19 J. FIN. INTERMEDIATION 418, __ (2010); Gary B. Gorton & Andrew Metrick, *Securitized Banking and the Run on Repo*, NBER Working Paper No. w15223 (Aug. 2009) *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1454939.

Leverage can also enter the credit derivative system in a second, subtler way. The credit protection seller does not have to commit funds upfront to cover its expected obligations to the buyer. This frees up capital that the seller can deploy elsewhere, including by underwriting additional credit derivatives. The credit protection buyer, however, may have concerns about the credit risk of its counterparty. Therefore, credit and other derivative contracts often include a margin feature, by which one party has to post certain collateral to secure its future payment obligations. A credit protection buyer, for example, may insist that a credit protection seller post cash or other assets as collateral for the seller's obligation to pay should a credit event occur. The contract may provide for the ability of one party to demand more collateral should the creditworthiness of the counterparty decline. These contractual margin requirements have an exact analogue in the margin rules of futures exchanges and clearing companies, which parties use to trade and settle futures and derivatives. Futures and derivative contracts are generally settled and cleared through a central clearing organization affiliated with the exchange. This clearing company thus intermediates and acts at the counterparty to both sides of every trade. To protect itself from counterparty risk, the clearing company typically imposes rules including margin requirements on participants.[38] Margin rules also have a close analogue in the collateral features of repurchase agreements.[39]

Taking a step back, lower collateral or margin requirements can equate with a derivative counterparty enjoying higher leverage. Lower collateral means that party to a derivative contract need deploy less of its own capital to cover its future payment obligations. Lower collateral also means that a firm may enter into more derivative contracts. When set too low, collateral requirements allow a firm to increase leverage excessively or to overinvest in derivative contracts.

d. Leverage and Systemic Risk: Take One

By magnifying potential losses, high leverage can increase the financial fragility of firms. Again, the web of credit derivatives means that the financial fragility of one firm can increase the fragility of others or of the entire financial system. Frank Partnoy and David Skeel describe a related way in which interconnected credit derivative contracts may increase systemic risk. They argue that when highly leveraged investors, such as hedge funds, invest in credit default swaps, they increase the risk that even small tremors in financial markets could cause a liquidity crisis as

[38] *See* Franklin R. Edwards, *The Clearing Association in Futures Markets: Guarantor and Regulator*, 3 J. FUTURES MARKETS 369 (1983)

[39] *Cf.* Gorton & Metrick, *supra* note 37, at __ (describing these collateral or "haircut" provisions).

firms then rush to unwind a web of connected derivative contracts at the same time.[40] Economist Markus Brunnermeier describes this phenomenon through the lens of network effects; many highly leveraged firms rushing to close out interconnected derivatives at once creates "network risk" or "gridlock risk."[41] The rush to close contracts can cause liquidity to dry up in both credit derivative markets and financial markets more generally. In other words, counterparty risk can transform into liquidity risk,[42] which can create systemic risk.

The interest of credit protection buyers in protecting themselves from counterparty risk imposes some discipline on the leverage of credit protection sellers. However, this discipline may prove insufficient for several reasons. First, the long chains of credit risk transfers make it difficult to calculate this risk. Moreover, the default of a major derivative counterparty may have severe spillover effects on entire financial markets. Looming systemic risk and the prospect of government bailouts means that part of the cost of a default on derivatives can be externalized on taxpayers.

II. HEDGING AND THE LINK TO CREDIT MARKETS: CREDIT DERIVATIVES IN THE SHADOW BANKING SYSTEM

The analysis in Part I, which focuses on counterparty risk and the microeconomic effects of credit derivatives, has been explored in the academic literature. However, it is but half the economic coin of these financial instruments and the leverage associated with them. This article argues that credit derivatives and leverage in the credit derivatives market also has macroeconomic effects. To understand these effects, it is important to see how credit derivatives can link back to consumer and commercial credit markets and thus impact the "real" economy.[43]

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[40] Frank Partnoy and David Skeel describe a related way in which interconnected credit derivative contracts may increase systemic risk. They argue that when investors such as hedge funds borrow (increase their leverage) to speculate in credit default swaps, they increase the risk that even small tremors in financial markets could cause a liquidity crisis as firms then rush to unwind a web of connected derivative contracts at the same time. Partnoy & Skeel, *supra* note __, at 1040.

[41] Markus K. Brunnermeier, *Deciphering the Liquidity and Credit Crunch 2007–2008,* 23 J. ECON. PERSP. 77, 96-97 (2009).

[42] Liquidity risk takes the following two forms:

> *Trading-liquidity risk* (also called market liquidity risk) is the risk that a firm cannot find a counterparty in the market willing to buy or sell the asset at fair market value. BANK FOR INTERNATIONAL SETTLEMENTS, PRINCIPLES FOR SOUND LIQUIDITY RISK MANAGEMENT AND SUPERVISION 1 n.2 (June 2008).
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> *Funding-liquidity risk* means "the risk that [a] firm will not be able to meet efficiently both expected and unexpected current and future cash flow and collateral needs without affecting either daily operations or the financial condition of the firm." *Id.*

[43] To be sure, counterparty risk and the failure of a major financial institution, such as AIG, because of credit derivatives could have significant impacts on the real economy. The collective microeconomic effects of credit derivatives can impact the macro-economy.

This Part II begins by outlining how credit derivatives represent a vital strand in the larger shadow banking system. The shadow banking system refers to a complex web of financial institutions and instruments that linked borrowers in commercial and consumer credit markets to investors in capital markets.[44]

a. A Primer on Credit Derivatives and Asset-Backed Securities

Consider the chain of credit derivatives depicted above in Diagram B. In that chain, the first credit derivative was a "pure bet" derivative. The other derivatives represented iterations of hedging this initial speculative contract (an entire chain that Lynn Stout would criticize as producing at once no net social gain and unnecessary counterparty risk). Yet that first credit derivative in the chain could instead have been a hedging credit derivative. In other words, Party A could have entered into that first credit derivative to hedge an existing credit risk. Indeed, one of significant use of credit default swaps is to allow firms to hedge the credit risk of bonds in their portfolio. More particularly, many firms before the Panic of 2008 used credit default swaps to hedge the risk of asset-backed securities they owned.[45] Asset-backed securities are financial instruments created when multiple loans, mortgages, or other assets that produce a predictable future cash stream are pooled together and sold to an investment vehicle which issues securities to investors. The investment vehicle uses the cash from the sale to investors to purchase the pool of loans, mortgages, or other underlying assets, then applies the cash received on those loans, mortgages, or assets, to make scheduled payments on the asset-backed securities to investors.[46] Diagram C below depicts the creation of a basic asset-backed securities transaction.[47]

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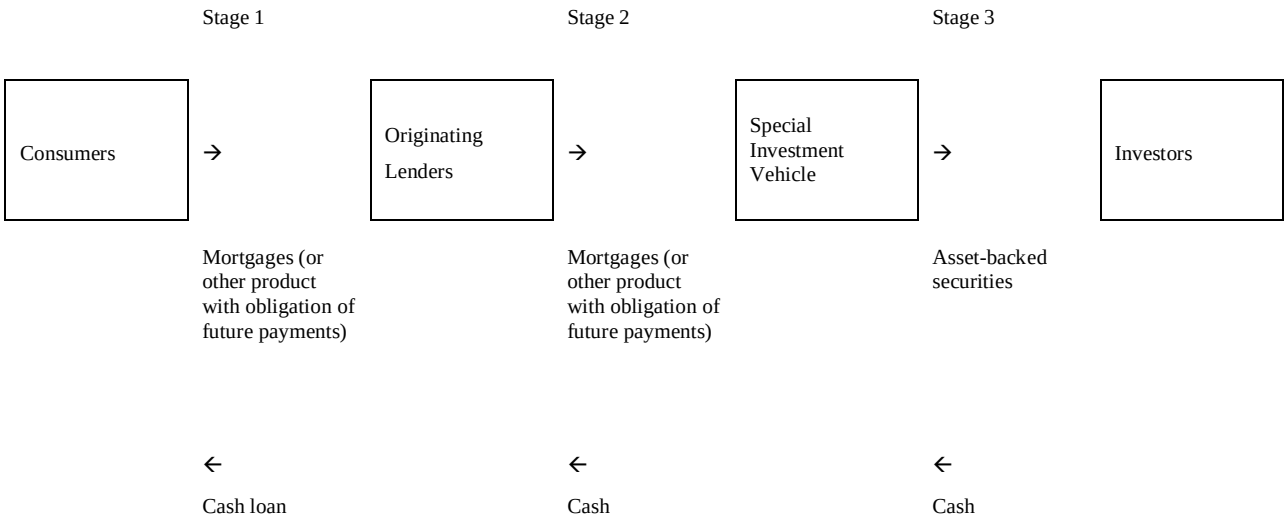
[44] *See supra* notes 23-24 and accompanying text.

[45] Gerding, *supra* note __, at 160.

[46] *Id.* at 147-49.

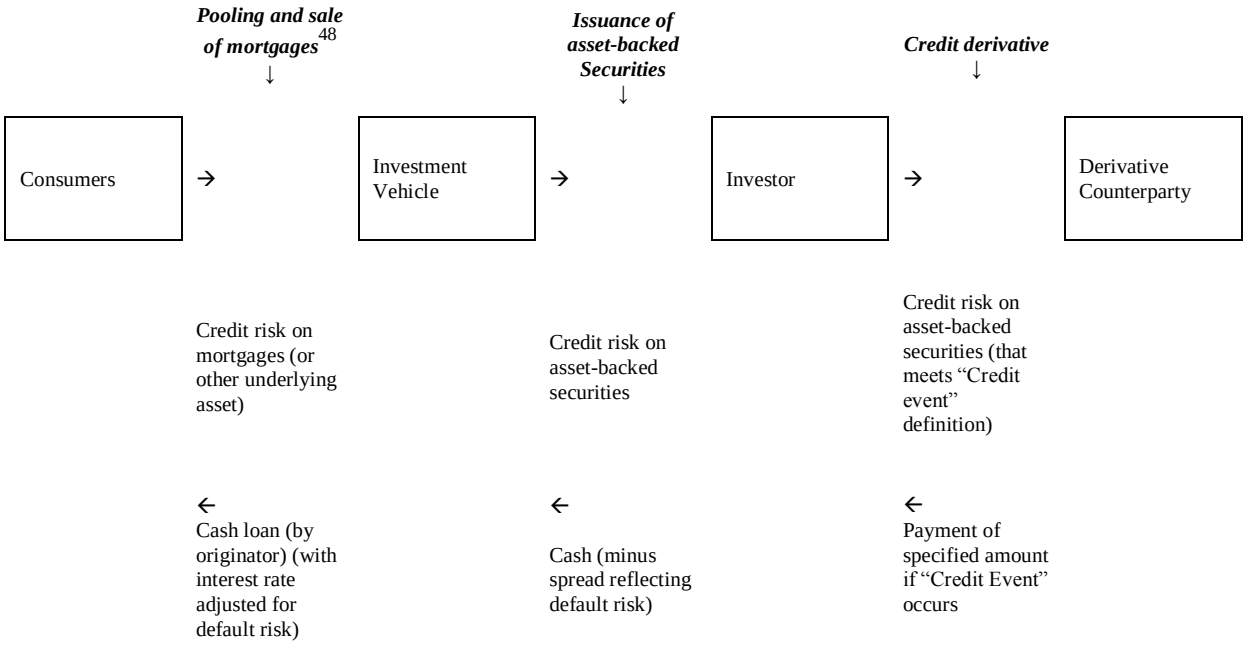
[47] This securitization process can be repeated again as asset-backed securities themselves can be pooled together sold to a second investment vehicle and used to use another class of asset-backed securities (called collateralized debt obligations or "CDOs"). CDO securities can in turn be securitized. Just as with hedging credit derivatives with credit derivatives, after rinsing, lathering, and repeating, long chains are created. *Id.* at 162-63. Professors Partnoy and Skeel categorize CDOs as another form of credit derivative. Partnoy & Skeel, *supra* note 8, at __.

Diagram C



If the investors in Diagram C above want to hedge the risk of their asset-backed securities defaulting (and thus hedge the credit risk of the underlying mortgages), they can purchase a credit default swap. The chain of transactions in Diagram C then would connect with Diagram A. Diagram D depicts this link:

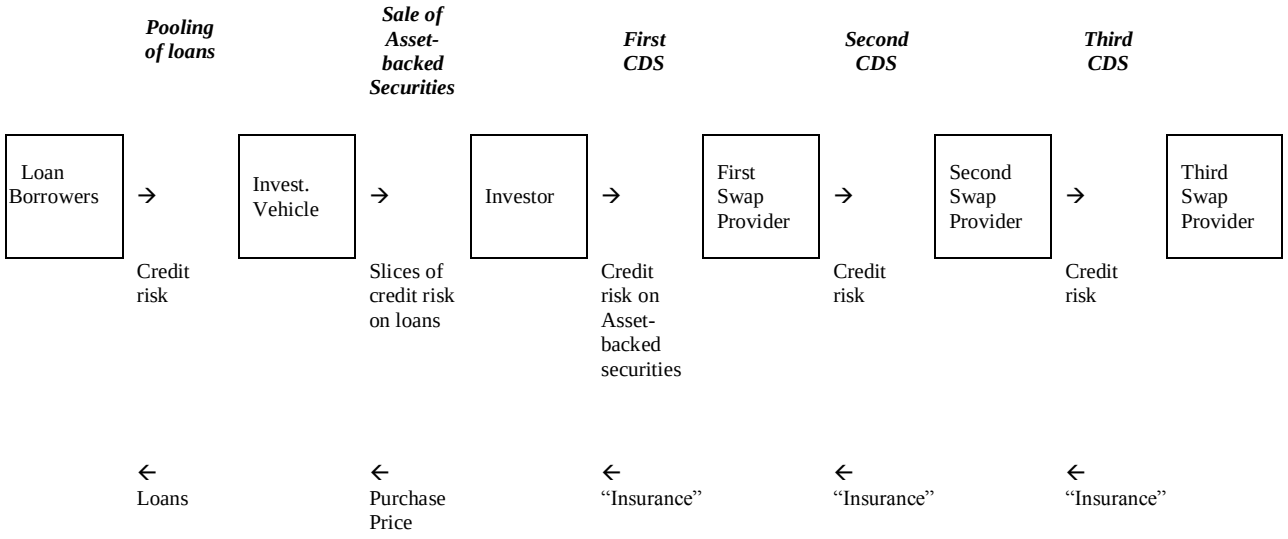
Diagram D



In turn, the credit protection seller under that credit default swap can hedge its risk (which includes the risk of default on the asset-backed securities and the underlying mortgages), by purchasing its own credit default swap. Thus the chain of transactions in Diagram D can be joined to the chain of credit derivatives in Diagram B. Diagram E below depicts this long concatenation of credit risk transfers:

48. For the sake of simplicity, this diagram removes the originator. If the originator is deemed to have made a "true sale" of the assets to the SIV, the assets are no longer considered part of the estate of the originator in bankruptcy. The SIV is then the outright owner of the consumer mortgages, and the originator no longer has any impact on the risk being transferred from borrowers to the SIV and investors. For a discussion of "true sales" in securitizations, see Steven L. Schwarcz, *Securitization Post-Enron*, 25 CARDOZO L. REV. 1539, 1543–48 (2004).

Diagram E



b. Leverage and Funneling Credit Back to Consumer and Commercial Lending Markets

This long chain of transactions depicts how credit derivatives can connect back to consumer and commercial credit markets. Moving left to right, each transaction represents a transfer of credit risk that originates with the loans or mortgages at the beginning of the chain. These transfers of credit risk ultimately allow more credit to flow in the opposite direction and ultimately all the way back to the loan or mortgage borrowers. To see how this works, consider when an investor in an asset-backed securities hedges the credit risk with the first credit default swap. By offloading credit risk, the investor frees up additional capital that it can deploy by purchasing additional asset-backed securities. A number of economists speculated that one of the consequences of credit derivatives would be to encourage financial institutions to seek additional risk. Instead of using hedging derivatives to reduce their exposures, institutions could replace the risk they offloaded with credit derivatives with new investments and fresh risk.[49] Empirical work suggests that many banks in fact used credit derivatives in this way. For example, economist Beverly Hirtle of the New York Federal Reserve Bank documents that banks

[49] Norvald Instefjord, *Risk and Hedging: Do Credit Derivatives Increase Bank Risk?*, 29 J. BANKING & FIN. 333, __ (2005) (positing that credit derivatives make it attractive for financial institutions to take on new risk as existing risk is hedged).

that increase their use of credit derivatives also increase their supply of loans to large corporate borrowers.[50]

Increased demand for asset-backed securities, in turn, increases demand for pools of loans or other mortgages, and thus funnels back more credit to borrowers in consumer and commercial loan markets. Thus increased leverage all along the chain translates into more credit for consumer and commercial borrowers.

How can leverage increase at each link of the credit transfer chain? Most basically, investors in asset-backed securities can increase their leverage by borrowing money directly. By contrast, credit derivatives can increase leverage in the system more subtly, but with the same effect of increasing the flow of credit to consumers and businesses. As noted above, when hedging credit derivatives are priced too cheaply or when collateral requirements are lowered, credit protection sellers provide more credit "insurance." This allows investors to offload more risk to the chain of credit derivatives and to purchase more asset-backed securities.

III. THE MACROECONOMIC EFFECTS OF LEVERAGE

a. Increasing Liquidity and the Effective Money Supply

The ability of credit derivatives and leverage to increase the amount of credit that flows to consumers and businesses can have significant macroeconomic consequences. The ability of credit derivatives to increase the leverage of financial institutions and the amount of credit that flows into loan markets can be re-characterized as increasing liquidity, or the supply of money, in financial markets. When financial institutions, *i.e.* firms that borrow to lend, increase their leverage through credit derivatives, the effects mirror those when they increase their leverage through borrowing.

The relationship between leverage and liquidity can be understood through the example of traditional banking. When a series of financial institutions increase their leverage and lend to one another in series, the amount of liquidity increases geometrically. The following hypothetical from introductory macroeconomics captures the money multiplier effect created by fractional reserve banking. Assume that banks face a capital requirement that they hold 10% of their capital in reserve. If the Federal Reserve lends $1,000 to Bank A, Bank A then lends the maximum amount allowed (taking into account the reserve requirement) to Bank B, Bank B lends the maximum amount to Bank C, and Bank C finally lends the maximum amount to

[50] Beverly Hirtle, *Credit Derivatives and Bank Credit Supply*, 18 J. FIN. INTERMEDIATION 125, __ (2009). Oddly, this study also find that increased use of credit derivatives by a bank correlates with a decrease in the bank's lending under existing commitments (such as extensions of existing loans). *Id.* at __. [Note: Cite to Goderis, B., March, I.W., Castello, J., Wagner, W., 2006. Bank behaviour with access to credit markets. Tilburg University Discussion Paper No.100.]

Company D, then the initial $1,000 loan from the central bank increased the effective money supply to $3,439.[51] If the capital requirement is lowered to 5%, the supply of money increases (by more than 5%) to $3,709.88.[52]

This hypothetical can be easily altered with loans changed to credit derivatives and capital requirements changed to collateral requirements. Leveraged credit risk transfers through a series of credit derivatives can also create liquidity. An easing of collateral requirements on credit protection sellers can have the same effect as a lowering of reserve requirements on banks. This analogy builds off recent economic research by Adrian and Shin and John Geanakoplos that explores how decreases in the margin requirements of repurchase agreements and other short term secured loans act to dramatically increase the leverage of financial institutions.[53] Dramatically increased leverage allows financial institutions to increase their lending and investments, swelling both their balance sheets and liquidity in financial markets.[54]

Applying the logic of fractional reserve banking to other channels of credit and leverage is not just a theoretical exercise. It is critical for understanding how the money supply and monetary policy in the modern economy. The modern financial system is no longer dominated by credit from deposit-taking banks. Over the last three decades, financial institutions and the "real economy" have increasingly received credit through the shadow banking system mentioned above, that is new mechanisms that link borrowers to capital markets investors. Tobias Adrian and Hyun Song Shin have documented the precipitous growth of this "market-based lending" compared to bank-based loans.[55] Again, securitization and credit derivatives represent important components of this shadow system.

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[51] Here is the simple arithmetic:

$1,000 (original amount loaned from Fed to A)
+$900 (amount that A loans to B while holding 10% in reserve)
+$810 (amount that B loans to C while holding 10% in reserve)
+$729 (amount that C loans to D while holding 10% in reserve)
$3,439

[52] Here is the calculation

$1,000.00 (original amount loaned from Fed to A)
+$950.00 (amount that A loans to B while holding 5% in reserve)
+$902.50 (amount that B loans to C while holding 5% in reserve)
+$857.38 (amount that C loans to D while holding 5% in reserve)
$3,709.88

Per introductory macroeconomics, the money multiplier is the inverse of the reserve ratio, as expressed by the following equation:

Money multiplier= 1/reserve ratio

N. GREGORY MANKIW, PRINCIPLES OF MACROECONOMICS 348-49 (2008).

[53] Tobias Adrian & Hyun Song Shin, *Money, Liquidity, and Monetary Policy*, 99 AMER. ECON. REV. 600, 602-03 (2009); Ana Fostel & John Geanakoplos, *Leverage Cycles and the Anxious Economy*, 98 AM. ECON. REV. 1211 (2008); John Geanakoplos, The Leverage Cycle, Cowles Found. Discussion Paper No. 1715 (July 31, 2009) *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1441943.

[54] Adrian & Shin, *supra* note 53.

[55] Tobias Adrian & Hyun Song Shin, *The Changing Nature of Financial Intermediation and the Financial Crisis of 2007–2009*, 2 ANN. REV. ECON. 603, __ (2010). **[Consider inserting Figures 4, 5, 7, or 8 from article.]**

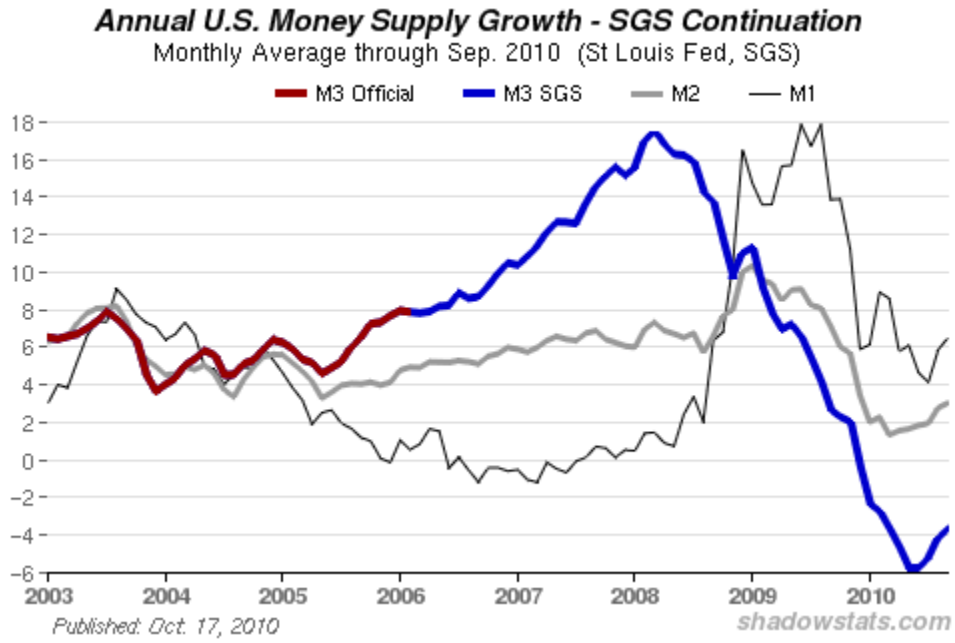
[Statistics on growth of asset-backed securities and derivatives]

If securitization, credit derivatives, and other market-based financing channels can increase liquidity in the economy, it would behoove central banks to carefully track how these channels affect the supply of money over time. However, as Margaret Blair notes, the Federal Reserve has moved in the opposite direction; instead of seeking broader metrics of the money supply, in 2006 the Federal Reserve stopped tracking M3, a broader measure of the money supply in the United States.[56] This may have had calamitous consequences, as some economists indicate that soon after M3 dramatically increased and diverged from narrower measures of the money supply.[57] In effect, the Federal Reserve decided to deactivate one of the plane's instruments just as that instrument would have warned that the craft was flying into a storm.

b. Leverage Can Fuel Asset Prices and Asset Price Bubbles

That storm was a binge of borrowing and an asset price bubble in housing. Loose monetary policy or easy credit in an economy can fuel inflation in asset markets and even generate asset price bubbles.[58] Conversely, tighter credit can burst bubbles and cause prices in

[56] Margaret M. Blair, Financial Innovation, Leverage, Bubbles the Distribution of Income, Vand. Pub. L. Res. Paper No. 10-40 (Oct. 18, 2010) *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1693913. [The following graph depicts an estimate of how M3 would have dramatically diverged from narrower gauges of the money supply soon after the Federal Reserve stopped measuring M3:



[57] *Id. citing* ___.

[58] **Cite.**

Research in experimental asset markets indicates that allowing investors to borrow money to purchase assets can exacerbate asset price bubbles. Erik F. Gerding, *Laws Against Bubbles: an Experimental-Asset-Market*

asset markets to plummet.[59] Even macroeconomists, such as Ben Bernanke, who have argued that monetary policy should not be used to combat inflation in specific asset markets or to prick asset price bubbles, do not dispute that tighter monetary policy could have this effect.[60] Taking a step back from policy prescription, the failure to understand and track broader measures of liquidity in the economy from market-based sources, such as securitization and credit derivatives, can cause macroeconomists and central banks to miss how additional liquidity can fuel dramatic rises in the prices of asset classes, such as residential real estate or securities.[61]

c. Feedback Loops: Bubbles Cover Mistakes in Pricing and Assessing Leverage

Booming asset prices and at worse bubbles can create vicious economic feedback loops. As one example, a sustained boom in asset prices can mask significant errors in pricing risk in that market.[62] This can be understood by returning to credit derivatives. A boom in an asset class such as residential housing would lower the rate of defaults on loans (mortgages) to investors in that class. As long as credit remains cheap and asset prices rise, investors can either flip the assets or refinance their loans.[63] Lower defaults on these loans would translate into lower defaults on asset-backed securities backed by those loans and in turn, lower payouts under credit derivatives that hedge the risk of those asset-backed securities. This may cause the credit protection seller in credit derivatives to misprice risk for at least three reasons. First, the credit protection sellers generally use models and historical data to price the loans. If the data does not reach back far enough in time to before the price boom, then the prices for the credit derivatives will overly discount the risk of a credit event occurring.[64] Second, agency costs and short-

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Approach to Analyzing Financial Regulation, 2007 WIS. L. REV. 977, 1030 *citing* Ronald R. King et al., *The Robustness of Bubbles and Crashes in Experimental Stock Markets*, *in* NONLINEAR DYNAMICS AND EVOLUTIONARY ECONOMICS 183, 188-89 (Richard H. Day & Ping Chen eds., 1993).

[59] ROBERT J. SHILLER, IRRATIONAL EXUBERANCE 222-23 (2001).

[60] Ben Bernanke & Mark Gertler, *Monetary Policy and Asset Price Volatility*, *in* NEW CHALLENGES FOR MONETARY POLICY: PROCEEDINGS OF THE FEDERAL RESERVE BANK OF KANSAS CITY 77(1999).

[61] Tobias Adrian & Hyun Song Shin, *Liquidity, Monetary Policy, and Financial Cycles*, FED. RES. BANK N.Y. CURRENT ISSUES IN ECON. & FIN. Vol. 14, No. 1 (Jan./Feb. 2008).

[62] *Cf.* Claudio Borio and Haibin Zhu, *Capital Regulation, Risk-taking and Monetary Policy: a Missing Link in the Transmission Mechanism*, BIS Working Paper No. 268 (Dec. 2008).

[63] Rising prices can mask the flaws in more exotic loans. For example, subprime mortgages have been described as having a binary quality, in which borrowers could afford these mortgages only so long as asset prices rose, credit remained cheap, and borrowers could exit mortgages by flipping the property or refinancing. Stephen G. Ryan, *Accounting in and for the Subprime Crisis*, 83 ACCOUNTING REV. 1605, __ (2008).

[64] Gerding, *supra* note __ , at 170-71. Economists have seen this same flaw in regulations governing loan loss provisions. If these regulations set loan loss reserves based on loan losses in the previous year or quarter, they may have procyclical effects. As prices rise during a boom period in the cycle, loan losses drop and regulations require less reserves. This frees up banks to make additional loans, which can spur further rises in prices. This feedback loop reverses when prices stagnate or drop. Lower prices can translate into higher loan default rates, which trigger higher reserve requirements. This, in turn, chokes of lending and can further depress asset prices. This feedback loop has led economists to call for dynamic loan loss provisioning regulations to exert a countercyclical effect.

termism among the employees at credit protection sellers may lead to inappropriate pricing of long-term risk; in other words, if the incentives of employees at financial firms skew towards short-term behavior, then the employees may be unlikely to take more conservative, long-term assessments of risk and ride a boom for all its worth.[65] Third, behavioral biases, such as the availability bias, may cause even financially sophisticated professionals to give excessive weight to recent and salient data – price booms – and overly discount older data – price crashes.[66]

d. Leverage Cycle

What is true for credit protection sellers in pricing the premiums for credit derivatives is equally true for credit protection buyers in demanding collateral from the sellers. Economists posit that this can create a vicious procyclical feedback loop as cheaper loans and credit derivatives and lower collateral requirements push asset prices higher, which loosens credit and lowers collateral requirements even further. Of course, this feedback loop can lurch sharply into reverse should asset prices fall: higher default rates cause lenders to tighten credit. In the world of credit derivatives, credit protection sellers decrease the sale of credit protection and credit protection buyers raise collateral requirements. All of which stanches the flow of credit, which depresses asset prices further and increases default rates. John Geanakoplos provides a formal model of this leverage cycle, which focuses on changes in the collateral requirements demanded by lenders.[67]

Professor Geanakoplos's theory receives empirical support from the research of Adrian and Shin, who present evidence that major financial institutions dramatically increased their leverage in the boom years in the United States, then dramatically decreased leverage after crises struck in 1987, 1998, and 2007.[68] They also show that the repo market, which these financial institutions rely on for short-term financing, grew significantly in the boom years leading to the Panic of 2008.[69] Although not the primary focus of their research, the market for credit derivatives exploded in the same period.[70]

Jaime Caruana, *Banking Provisions and Asset Price Bubbles*, *in* ASSET PRICE BUBBLES: THE IMPLICATIONS FOR MONETARY, REGULATORY, AND INTERNATIONAL POLICIES 537 (William C. Hunter et al. ed.s, 2003).

[65] *Cf.* Patrick Bolton et al., *Executive Compensation and Short-Termist Behaviour in Speculative Markets*, 73 Rev. Econ. Stud. 577 (2006) (presenting model of compensation leading to excessive short term behavior by managers).

[66] **Cite.**

[67] Geanakoplos, *supra* note 53.

[68] Tobias Adrian & Hyun Song Shin, *Money, Liquidity, and Monetary Policy*, 99 AMER. ECON. REV. 600, 602-03 (2009).

[69] **[Cite Adrian & Shin articles.]**

[70] [**Cross reference stats on credit derivative boom.]**

e. Collective Action

To the extent credit derivatives increases counterparty risk, participants in these contracts have some capacity and incentive to limit the leverage of their counterparties or to hedge. This capacity and incentive, however imperfect in the context of counterparty risk, fail to address the macroeconomic dimension of credit derivatives and leverage. Parties to any individual credit derivative may struggle to see the extent to which the collective leverage of counterparties throughout the entire web of credit derivatives are increasing liquidity in asset markets. Unable to gauge this macroeconomic effect, they can thus miss the myriad other affects, such as the masking of pricing mistakes and the turning of a leverage cycle.

IV. IMPLICATIONS

The Macroeconomic effects of credit derivatives and other financial instruments that create leverage argue for adding a macroeconomic dimension to the regulation of these contracts. These effects argue for greater integration of the regulation of the leverage that credit derivatives can create – regulation that has been primarily conceived of in microeconomic terms or as prudential regulation of financial institution – and macroeconomic policies. Conversely, changes in the regulation of leverage in credit derivative transactions may have profound macroeconomic effects. What is true for credit derivatives applies equally to other instruments or regulations that can increase of decrease the leverage of financial institutions. The following sections explore some of the policy implications of the macroeconomic effects of leverage implications.

a. Dodd-Frank and the Missing Macroeconomic Dimension of Credit Derivative Regulation.

Most immediately, the macroeconomic effects of credit derivatives and the leverage they can create argues for at once a more nuanced and a broader understanding of the provisions of the Dodd-Frank Act on OTC derivatives. That statute includes two important provisions on OTC derivatives. First, the act generally requires that OTC derivatives move to exchange trading and central clearing.[71] Moving OTC derivatives to exchanges would promote market pricing of, and a more liquid market for, derivatives. Central clearing would insert a clearing entity between derivative counterparties. By becoming counterparty to both sides of derivative trades, the clearing entity would centralize counterparty risk, which it would then mitigate by

[71] *See supra* note 5.

requiring position limits and collateral requirements of all counterparties.[72] Second, the act authorizes Federal regulators to set collateral requirements for those derivatives exempted from the exchange-trading and central-clearing mandate.[73]

These two components of Dodd-Frank may be at once too broad and too narrow. They may paint with too broad a brush in that they apply to all OTC derivatives. Credit derivatives, by virtue of their unique capacity to inject liquidity into credit markets, merit different treatment. At the same time, these provisions may generate regulations that are too narrow. Central clearing has largely been conceived in terms of promoting transparent pricing and limiting counterparty risk and the risk of financial institutions falling like dominoes.[74] Dodd-Frank explicitly frames the authority for regulators to set collateral requirements for non-cleared derivatives as an anti-evasion device for the central clearing requirement.[75] Meanwhile, the potential macroeconomic effects of greater collateral or margin requirements have been largely invisible in the debate over financial reform. Increasing collateral requirements for credit derivatives would affect the supply of liquidity to the asset markets associated with those derivatives.

b. The Missing Macroeconomic Dimension of Leverage Regulations Generally

The macroeconomic dimension of collateral requirements for derivatives also highlights the macroeconomic potential of a host of other regulations that require financial institutions to hold greater capital in reserve and thus restrict their leverage. These financial regulations include capital requirements, caps on leverage, loan loss reserves, and even credit retention requirements in a securitization.

This last category merits special consideration. After the Panic of 2008, policymakers became concerned that when the lenders that originate mortgages or other loans sell these assets to an investment vehicle (the first stage in Diagram C above), their incentive to check the creditworthiness of borrowers dulls. This generates a classic lemons problem. This concern generated proposals, including a provision ultimately found in the Dodd-Frank Act, that requires regulators to consider new rules requiring originating lenders to retain a portion of loans sold in a securitization. But, as with credit derivatives and counterparty risk, credit retention and lemons is only the microeconomic half of the story. Requiring that lenders hold onto part of their loans,

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[72] Darrell Duffie & Haoxiang Zhu, Does a Central Clearing Counterparty Reduce Counterparty Risk?, Rock Cntr. Corp. Gov. Stan. Univ. Working Paper No. 46, (July 24, 2010) *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1348343.

[73] *See supra* note 6.

[74] **Cite Obama speech.**

[75] *See supra* note 6.

restricts the capital they can deploy for new loans and thus throttles back the amount of additional credit that can flow back to consumers and businesses. In fact, credit retention is one of the few places in which the Dodd-Frank Act explicitly recognizes the macroeconomic capacity of leverage regulations.[76]

In sum, a host of prudential regulations must now be thought of not only in micoeconomic terms, but also in terms of their monetary or macroeconomic impact.

c. An Expanded Toolbox for Monetary Policy; Fighting Bubbles?

The potential macroeconomic impact of these regulations, including collateral regulations for credit derivatives, leads naturally to questions over whether these regulations could and should be used as instruments of monetary policy. Might regulations of the collateral for credit derivatives – together with other regulations governing financial institution leverage such as capital requirements and leverage caps – offer new tools in the macroeconomic toolbox?

New tools could change an old debate. Could these tools allow central banks and economic policymakers to target inflation in particular asset markets more surgically? Plainly stated, could collateral regulations help combat asset price bubbles? The last generation of macroeconomists waged a fierce debate over whether monetary policy should be used to combat inflation or potential bubbles in particular overheating asset markets. One camp, led by former Princeton economist and now Federal Reserve Chairman Ben Bernanke, argued that central bank could not identify asset price bubbles *ex ante* with confidence.[77] However, in the wake of the Panic of 2008, central bankers in other countries have become more comfortable with the ability and necessity of their institutions using judgment to combat bubbles.[78] Yet even increased comfort with the use of judgment does not address another concern with using monetary policy

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[76] **Cite Dodd-Frank provision requiring study of effect of credit retention requirements on asset price bubbles.**

[77] Bernanke & Gertler, *supra* note 60.

[78] Mark Carney, Governor of the Bank of Canada, Some Considerations on Using Monetary Policy to Stabilize Economic Activity, Remarks for Fed. Res. Bank of Kansas City Symposium, Jackson Hole, Wyoming, (Aug. 22, 2009) *available at* http://www.kansascityfed.org/publicat/sympos/2009/papers/carney.08.22.09.pdf; Andrew Mountford, *Leaning into the Wind: A Structural VAR Investigation of UK Monetary Policy*, 67 OXFORD BULL. ECON. & STAT. 597 (2005). These central bankers have aligned with a view of one camp of macroeconomists that monetary policy can and should be used to dampen inflation in particular asset markets. *See, e.g.*, Frank H. Westerhoff and Cristian Wieland, *Spillover Dynamics of Central Bank Interventions*, 54 GERMAN ECON. REV. 435 (2004).[78] *E.g.* STEPHEN CECCHETTI ET AL., ASSET PRICES AND CENTRAL BANK POLICY (2001). At least until the current global financial crisis, the dominant view among macroeconomists is that monetary policy should not address potential bubbles. *See* [Benjamin M. Friedman, *Comments on Implications of Bubbles for Monetary Policy*, *in* ASSET PRICE BUBBLES: THE IMPLICATIONS FOR MONETARY, REGULATORY, AND INTERNATIONAL POLICIES, *supra* note __, 459, 460.]

to combat bubbles: changes to interest rates would have spillover effects for other sectors of the economy beyond the particular asset market that is overheating. For example, raising interest rates to dampen prices in housing markets would impact other asset classes, such as commercial real estate or stock markets, as well as affect employment, currency exchange rates, foreign trade, and a raft of other economic concerns. Ben Bernanke captured this concern over spillover effects with his lurid warning against conducting "brain surgery with sledgehammer."[79]

Expanding the monetary toolbox, however, could provide macroeconomic policy makers with a set of scalpels. Regulators could narrowly tailor (or "Taylor") rules such as collateral requirements for credit derivatives or capital requirements for banks for specific classes of assets. For example, requiring higher collateral requirements for a credit derivative that hedges credit risk from mortgages or higher bank capital for loans to specific economic sector. Regulators could then calibrate these asset-class-specific regulations when particular asset markets appear to overheat or collapse. To continue the airplane metaphor introduced above, these tools would provide pilots with finer controls of trim.

This use of prudential regulation for monetary policy has precedent. Reserve requirements for banks used to be one of the tools for monetary policy before falling largely into disuse in the twentieth century.[80] Federal margin rules provide another example. These rules, introduced in the New Deal, restrict the ability of banks and broker dealers to lend money to investors to purchase stock.[81] These regulations stemmed from concerns in the wake of the 1929 Crash that credit had fueled excessive speculation.[82] In response, the U.S. Securities Exchange Act of 1934 gave the Federal Reserve the responsibility to establish margin regulations and the SEC the responsibility to enforce them.[83] The Federal Reserve has passed separate regulations restricting the extension of credit by broker dealers,[84] banks, and all other types of lenders.[85] The fact that Congress gave the Federal Reserve responsibility for setting the level of margin regulations suggests that policymakers realized that a broader policy kit for addressing overheating markets (including potential bubbles) was necessary and that monetary policy might

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[79] Governor Ben S. Bernanke, Asset Price "Bubbles" and Monetary Policy, Remarks at the New York Chapter of the National Association for Business Economics, New York, New York (Oct. 15, 2002) *available at* http://www.federalreserve.gov/BoardDocs/Speeches/2002/20021015/default.htm.

[80] Cite.

[81] Margin regulations have their statutory basis in Section 7 of the Securities Exchange Act of 1934 (15 U.S.C. § 78g (2009)).

[82] Gikas Hardouvelis & Steve Peristiani, *Do Margin Requirements Matter? Evidence from U.S. and Japanese Stock Markets*, 14:4 FED. RES. BANK N.Y. Q. REV. 14 (Winter 1989-1990).

[83] 15 U.S.C. § 78g (2009).

[84] Credit by Brokers and Dealers (Regulation T), 12 C.F.R. § 207 (2009).

[85] Credit by Banks and Persons other than Brokers or Dealers for the Purpose of Purchasing or Carrying Margin Stock (Regulation U), 12 C.F.R. § 221 (2009); *see also* Borrowers of Securities Credit (Regulation X), 12 C.F.R. § 224 (2009).

encompass other tools.[86] More recently, Chinese policymakers have deployed capital requirements and blunter restrictions on bank lending to curb possible asset price bubbles in that country's stock and real estate markets. [87]

However, the narrowness of these "new" monetary tools comes at the cost of effectiveness. "Traditional" or "sledgehammer" tools of monetary policy, such as central bank lending and open market operations can raise interest rates across the board. Narrower monetary regulations, such as collateral regulations for credit derivatives and capital requirements, can be sidestepped by market participants. Higher collateral requirements for derivatives in the United States might cause financial institutions to seek counterparties abroad. Restrictions on broker-dealers or banks lending to investors encourage those investors (with the help of lawyers) to seek credit from other sources. Investors and financial firms can exploit the incompleteness of regulations and develop workarounds, as witnessed by the continuing gamesmanship of capital requirements.[88] Moreover, restrictions on loans or investments in a particular asset class may simply drive investors to close, but less regulated economic substitutes. In sum, the varietals of regulatory arbitrage may thus limit the effectiveness of financial regulations as tools of monetary policy.[89]

d. The Macroeconomist's Blindspot: Arbitrage, Deregulation, and other Regulatory Change

Nevertheless, the potential for arbitrage of regulations argues that central banks and macroeconomic policymakers must closely track changes in the effectiveness of these regulations. If regulatory arbitrage, deregulation, or deteriorating legal compliance, allows financial institutions to take on more leverage, than liquidity or the effective money supply may increase regardless of whether leverage regulations are used as monetary tools. Yet regulatory change – whether from regulatory arbitrage, deregulation, or deteriorating compliance – remains a blind-spot for macroeconomic policy makers. As noted above, the Federal Reserve decided to narrow its tracking of the money supply, at the same time as alternative lending and liquidity creating channels began to turbo-charge the economy. Central banks largely missed the macroeconomic significance of the mushrooming shadow banking system – that web of financial instruments and institutions that connected borrowers to capital markets and bypassed traditional lending by depository banks.

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[86] **Cite**.
[87] Bernard Simon, *Metal Prices Fall; 'Froth' Is Blown Off Market*, N.Y. TIMES, Apr. 30, 2004, at __.
[88] **Cite**.
[89] For a typology of forms of regulatory arbitrage, see Victor Fleischer, *Regulatory Arbitrage*, 89 TEXAS L. REV. __(forthcoming 2010), *draft available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1567212.

The shadow banking system is largely a creature of regulatory arbitrage, it was nourished by deregulation, and, in some cases, it metastasized when laws were flouted.[90] Shadow banking is in fact regulatory arbitrage writ large; financial institutions developed financial instruments, such as asset-backed securities and credit derivatives, to connect borrowers to capital markets because of the heavy regulatory costs borne by traditional banking. As a case in point, money market funds, a proto-shadow banking institutions, first flourished because they could offer investors higher interest rates than federally regulated bank deposits under Regulation Q.[91] Credit default swaps themselves were carefully crafted to avoid regulation as bond insurance.[92] In turn, competition from the booming credit derivatives market encouraged regulated monoline bond insurers to take further risks in their underwriting.[93]

Furthermore, shadow banking institutions flourished in an environment of deregulation. Deregulation encompasses not only the repeal of statutes and regulations, but also new statutes that preempted regulatory action. Consider how the Commodities Futures Modernization Act of 2000 precluded regulation of OTC derivatives by states, the SEC, and the Commodity Futures Trading Commission.[94] Deregulation can take even softer forms when courts and agencies change interpretations of existing regulations[95] or regulators resist applying or enforcing existing rules to new contexts.[96]

Regardless of the form that legal change takes, regulators must be aware of it in order to understand its monetary and macroeconomic consequences. Macroeconomists and central bankers may have something to learn from prudential regulators and legal scholars about when and how legal change is occurring. Legal experts might explain to macroeconomists subtler forms of deregulation, such as changing interpretations of derivative regulations, just as macroeconomists might explain to lawyers and regulators the potential macroeconomic consequences of such changes. The need to develop better measures of liquidity reveals yet another collateral benefit of Dodd-Franks' credit derivative regulations. Moving credit derivatives to exchanges and setting collateral requirements for other credit derivatives would

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[90] **Cite.**

[91] [ERIK F. GERDING, BUBBLES, FINANCIAL REGULATION, AND LAW [Ch. 10] (forthcoming 2011); William A. Birdthistle, *Breaking Bucks in Money Market Funds*, 2010 WIS. L. REV. 1155, ___.

[92] **Cite.**

[93] [ERIK F. GERDING, BUBBLES, FINANCIAL REGULATION, AND LAW [CH. 8] (forthcoming 2011)

[94] **Cite.**

[95] Professor Saule Omarova examines how the Office of the Comptroller of the Currency changed the definition of the "business of banking" incrementally over several years to allow banks to increasingly deal in derivatives. Saule T. Omarova, *The Quiet Metamorphosis: How Derivatives Changed the "Business of Banking,"* 63 MIAMI L. REV. 1041 (2009).

[96] **Cite Greenspan examples.**

allow central bankers to gather vital data on the amounts of credit derivatives, the asset markets they affect, and how the leverage they create. Indeed, knowing is half the battle.[97]

d. Coordination of prudential regulation and macroeconomic policy

The macroeconomic effects of credit derivatives, their regulation, and a host of other regulations governing financial institution leverage also argue for changes in institutional design. More particularly, these affects demonstrate the need for greater integration of prudential regulation and monetary policymaking. This particular argument for institutional design has historical precedent. Financial history underscores how deregulation of financial institution lending during low monetary interest rate environments can create a crisis cocktail. Witness, for example, how the deregulation of the banking sector by Scandinavian countries in the 1980s combined with monetary policy to create real estate bubbles and banking crises.[98] This Scandinavian episode led to some scholars arguing for deeper integration of prudential regulation and monetary and macroeconomic policy.[99]

e. The Academic Gap: Towards 'Law and Macroeconomics'

Institutional design requires intellectual capital. If macroeconomic policy is to be better integrated with prudential regulation, then academics must build bridges to span the yawning gulf between macro- and microeconomics.[100] This gulf does not exist in the legal academy, because "law and economics" means microeconomics; not even a chair is reserved at the table for macroeconomics.[101] On the bright side, the field is open and the list of items on the research agenda long. Models and empirical data can help map out the monetary or other macroeconomic impacts of given regulatory change. Given the opacity of OTC derivatives, we have imperfect data about how privately negotiated collateral requirements for these instruments changed in the run-up to and during the current financial crisis. There is much theoretical and empirical work to

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[97] G.I. Joe.

[98] *See* Erik F. Gerding, *Deregulation Pas de Deux: Dual Regulatory Classes of Financial Institutions and the Path to Financial Crisis in Sweden and the United States*, 15 NEXUS 135, 149-150 (2010). *See also* E. PHILLIP DAVIS, DEBT FINANCIAL FRAGILITY AND SYSTEMIC RISK 256 (1995); Peter Englund, *The Swedish Banking Crisis: Roots and Consequences*, 15 OXFORD REV. ECON. POL'Y 80, 88-89, 95-96 (1999); Lars Jonung, *Lessons from Financial Liberalisation in Scandinavia*, 50 COMP. ECON. STUD. 564, 577 (2008) (describing general trend of financial deregulation in Scandinavian countries in 1980s triggering asset price booms); Urban Bäckström, *What Lessons Can be Learned from Recent Financial Crises? The Swedish Experience*, 1997 FED. RES. BANK K.C. PROCEEDINGS 129, 130 ("Credit market deregulation in 1985 . . . meant that monetary conditions became more expansionary.")

[99] Bent Sofus Tranøy, *The Swedish Financial Sector 1985-92: Policy-assisted Boom, Bust and Crash*, *in* SUCCESS AND FAILURE IN PUBLIC GOVERNANCE: A COMPARATIVE ANALYSIS (Mark Bovens et al. ed.s, 2001).

[100] *See* RICHARD A. POSNER, A FAILURE OF CAPITALISM: THE CRISIS OF '08 AND THE DESCENT INTO DEPRESSION 231-32 (2009) (arguing that the crisis provided a "wake-up call to the economics profession" and underscored the need to integrate macroeconomics with work in finance theory on the operation of financial markets).

[101] *See supra* note 22 and accompanying text.

be done before regulators have a sense of the macroeconomic impact of different regulations on credit derivative collateral or the impact if these regulations are skirted or otherwise rendered ineffective. For now, only connect.