FINANCIAL INNOVATION, LEVERAGE, BUBBLES AND THE DISTRIBUTION OF INCOME

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I. Introduction

Although Congress has passed and the President has signed the Dodd-Frank Wall Street Reform and Consumer Protection Act, one of the most important problems facing regulators is scarcely addressed in the bill, leaving it to regulators to address as they work out the details of a new regulatory scheme. This is that financial innovation has made it possible for financial firms to utilize vastly too much "leverage"—to supply too much credit to others and to borrow too much in order to provide this credit. The effect has been a financial system in the U.S. (and globally as well) that is too large in several senses: it uses too much debt, it creates too much credit, it thereby fuels asset bubbles that expose the rest of the economy to too much risk and its employees and investors are paid too much because they are generally paid for appearing to add value, even if the value later evaporates when the bubbles burst.

This assertion challenges the pre-financial crisis conventional view that the growth and innovativeness of the financial sector unequivocally improve the efficiency with which investors save and capital is aggregated and deployed to finance productive investment,[1]

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and helps to allocate risk to those who can most efficiently bear it.[2] The recent financial market crisis, however, provides good reason to

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[1] Raghuram G. Rajan & Luigi Zingales, *Financial Dependence and Growth*, 88 AM. ECON. REV. 559, 561-62 (1998) ("There has been extensive theoretical work on the relationship between financial development and economic growth. Economists have emphasized the role of financial development in better identifying investment opportunities, reducing investment in liquid but unproductive assets, mobilizing savings, boosting technological innovation, and improving risk taking. All these activities can lead to greater economic growth."); Martin Neal Baily, Robert E. Litan & Matthew S. Johnson, Brookings Inst., The Origins of the Financial Crisis (Nov. 2008), http://www.brookings.edu/papers/2008/11_origins_crisis_baily_litan.aspx?p=1 ("The financial crisis that has been wreaking havoc in markets in the U.S. and across the world since August 2007 had its origins in an asset price bubble that interacted with new kinds of financial innovations that masked risk; with companies that failed to follow their own risk management procedures; and with regulators and supervisors that failed to restrain excessive risk taking."); ROBERT E. LITAN, BROOKINGS INST., IN DEFENSE OF MUCH, BUT NOT ALL, FINANCIAL INNOVATION 15-38 (Feb. 17, 2010), http://www.brookings.edu/~/media/Files/rc/opinions/2010/0217_financial_innovation_litan/0217_financial_innovation_litan.pdf ("My ultimate verdict is that . . . there is a mix between good and bad financial innovations, although on balance I find more good ones than bad ones.").

[2] Raghuram G. Rajan, *Has Financial Development Made the World Riskier?*, 2005 ECON. SYMP. 313, 314-15, *available at* http://www.kansascityfed.org/Publicat/sympos/2005/PDF/Rajan2005.pdf (explaining how new choices by individual savers and increased investment in illiquid assets by banks has changed the nature of risk and risk taking in capital markets); Mike Konczal, *Shadow Banking: What It Is, How it Broke, and How to Fix It*, THE ATLANTIC, July 13, 2009, *available at* http://www.theatlantic.com/business/archive/2009/07/shadow-banking-what-it-is-how-it-broke-and-how-to-fix-it/21038 (cataloging the shadow banking system's ability to move certain types of risks off banks' balance sheets and discussing the new forms of risk the shadow banking produced); Ben S. Bernanke, Chairman, Fed. Reserve Sys., Speech at The Credit Channel of Monetary Policy in the Twenty-first Century Conference: The Financial Accelerator and the Credit Channel (June 15, 2007) [hereinafter Bernake Speech], *available at* http://www.federalreserve.gov/newsevents/speech/bernanke20070615a.htm ("Economic growth and prosperity are created primarily by what economists call 'real' factors—the productivity of the

challenge these claims. Financial services and financial innovation undoubtedly facilitate productive investment up to a point. But, in the last few decades, the U.S. economy has invested a growing share of GDP in a financial system that, at least at the margin, is using too much debt, creating too much credit and absorbing more in the way of social and economic resources than it is producing.

Regulators now confront a financial sector that has grown too large in several senses: First, financial innovation has made it possible for numerous financial institutions that are outside the regulated part of the banking system to provide credit, liquidity and money-like financial instruments. This network of non-bank institutions, together with the securities they issue and trade, has been called a "shadow banking system" because, while this network has become integral to the way regulated banks operate, it has operated largely outside the regulations that govern banks and other depository institutions.[3] Activity in the shadow banking system facilitates the use of much higher levels of leverage than can or would be used in the formal banking system and the shadow banking system thereby engages in numerous transactions that might not have happened at all in the past because no bank or bank-like institution

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workforce, the quantity and quality of the capital stock, the availability of land and natural resources, the state of technical knowledge, and the creativity and skills of entrepreneurs and managers. But extensive practical experience as well as much formal research highlights the crucial supporting role that financial factors play in the economy."); Timothy F. Geithner, President and Chief Executive Officer, Fed. Reserve Bank of N.Y., Remarks at the Global Association of Risk Professionals (GARP) 7th Annual Risk Management Convention & Exhibition in New York City: Risk Management Challenges in the U.S. Financial System (Feb. 28, 2006), *available at* http://www.ny.frb.org/newsevents/speeches/ 2006/gei060228. html (describing the general benefits the financial system brings to the world economy but also noting that the global financial system is vulnerable to intermittent panics and mania); Lorenzo Bini Smaghi, Member of the Executive Board, European Central Bank, Speech at the Nomura Seminar: Has the Financial Sector Grown Too Big? (Apr. 15, 2010), *available at* http://www.ecb.int/press/key/date/2010/html/sp100415.en.html (arguing that efficient financial markets produce growth but that overly large financial markets can also introduce economic risk).

[3] Tobias Adrian & Hyun Song Shin, *The Shadow Banking System: Implications for Financial Regulation* 2009, at 14-16 (Fed. Reserve Bank of N.Y., Staff Report No. 382, 2009) (discussing pre-2008 increase in bank leverage as a cause of the Financial Crisis and proposing regulatory frameworks to check the financial system).

would have been willing, or permitted by regulators, to engage in such transactions. Many of these transactions may have facilitated useful investment in the real economy, but a substantial share of the additional transactions made possible by the shadow banking system has been wasteful or even destructive.

The shadow banking system evolved largely for the purpose of hiding leverage from regulators or getting it outside of the reach of regulators. Yet, prior to the crisis, regulators and legislators chose not to intervene and not to try to extend regulatory oversight to these new institutions and financial instruments, largely accepting the industry's argument that less regulation and more innovation would lead to greater growth in the economy.[4]

Second, some scholars and policy analysts have argued that problems in the financial system arose because large banks and other financial institutions are "too big to fail."[5] This is one facet of the problem. But a more serious problem is that the system in the aggregate is too big and too highly leveraged. Regulators have not previously been able to prevent institutions outside the banking system from operating with excessive leverage and engaging in other high-risk transactions, as AIG and many other institutions did. The Dodd-Frank Act addresses this problem only indirectly, by authorizing the Board of Governors of the Federal Reserve System to take over the regulation of financial institutions, including non-bank institutions, deemed to be a threat to the safety and soundness of the financial system.[6] Yet it may not be clear which institutions constitute such a threat until it is too late for regulators to prevent a panic aimed at assets in the shadow banking system, such as what we saw in the fall of 2008.[7]

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[4] Konczal, *supra* note 2 (proposing new regulations that would prevent a repeat of the 2008 financial crisis).

[5] SIMON JOHNSON & JAMES KWAK. 13 BANKERS: THE WALL STREET TAKEOVER AND THE NEXT FINANCIAL MELTDOWN 202-03 (2010) (detailing the genesis of the term "too big to fail" and the organizations to which the concept applies).

[6] Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, §§ 112-13, 124 Stat. 1394-1402 (2010).

[7] Markus K. Brunnermeier, *Deciphering the Liquidity and Credit Crunch 2007-2008*, 23 J. ECON. PERSPECTIVES. 77, 82-91 (2009) (providing a timeline for key events surrounding the Financial Crisis); Gary B. Gorton & Andrew Metrick, *Securitized Banking and the Run on Repo* 13-14 (Nat'l Bureau of Econ. Research, Working Paper No. 15223, 2009) (providing a timeline for the credit crisis during 2007 and 2008); Daniel Covitz, Nellie

The objection that many economists and policy analysts may make to my assertion that the system is too large and too highly leveraged arises from an assumption that an efficient and unregulated capital market will not, consistently and systematically, provide "excessive" credit, nor should it systematically finance inefficient investments. Standard economic theory tells us that any such problem should be self-correcting in a market economy: investors who provide financing to the banks and shadow banks should refuse to provide further financing if the institution becomes too highly leveraged. Further, if the prices of assets financed by such leverage are driven up by excessive debt financing, they should be less attractive as investments, encouraging investors to redirect their investment dollars.

I argue, however, that financial markets might not always be self-correcting even if all investors are fully rational. Why? The reason is that finance is different from other sectors because what it creates is credit, and credit acts like a monetary stimulus to the economy, pushing up prices in the same way that printing excess money would be expected to drive up inflation. Unregulated financial firms can create an almost endless supply of credit simply by operating at higher degrees of leverage.[8] Leverage greatly enhances the return on equity for bank shareholders and other investors in the shadow banking system in good times, when asset values are rising. It also increases the losses in bad times and those losses often fall on others, such as creditors of the financial firms. Moreover, neither creditors nor shareholders in a financial firm bear all of the costs when a financial firm fails. This is because the failure of a single institution may force that institution to sell assets quickly, and if the institution is large, this can drive asset prices further down, causing other institutions to have losses so that they too are forced to sell.[9] In

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Liang & Gustavo Suarez, Fed. Reserve Bank of S.F., The Anatomy of a Financial Crisis: The Evolution of Panic-Driven Runs in the Asset-Backed Commercial Paper Market 2 (2009).

[8] In certain sectors of the financial market, "leverage" has become a term of art that means the ratio of the total value of an asset to the amount of equity (or sometimes "capital") used to finance the asset. In more traditional and common usage of the term, it means the ratio of debt to equity, or debt to total assets. All of these ratios are ways of measuring the degree to which a firm or investor is relying on borrowed money to make its investments.

[9] Brunnermeier, *supra* note 7, at 92-94 ("A *loss spiral* arises for leveraged investors because a decline in the value of assets erodes the investors' net

extreme situations, as we have seen in the recent financial crisis, taxpayers may be called upon to prop up troubled institutions to prevent a downward spiral of asset prices that can devastate the whole economy.

These factors provide a third sense in which the financial sector is too large: for the reasons reviewed above, and others which I will explain below, individual institutions will tend to operate with leverage that is too high and will encourage customers to borrow too much. In this way, the financial system as whole tends to generate too much credit if it is not prevented from doing so by regulators.[10]

The effect of excessive credit on the system as a whole can be explained by a simple analogy to the idea of the "money multiplier" and the "quantity theory of money" from Econ 101. The idea behind the "money multiplier" is that activities of the banks in the banking system have the effect of increasing the amount of "money" in an economy beyond the amount that is put into the economy by the Federal Reserve Bank ("Fed"). Nonetheless, the Fed can roughly control the amount of money banks add to the economy by regulating banking activity. Through this mechanism, the Fed can try to prevent inflation by keeping the supply of money from growing too fast.[11] An innovative financial sector, however, can create lots of substitutes for money (such as credit cards, money market mutual funds, home equity lines of credit and commercial paper), and these substitutes have not been as well-regulated as are traditional banking activities. A rapid expansion in vehicles that

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worth much faster than their gross worth (because of their leverage) and the amount that they can borrow falls.").

[10] John Geanakoplos, *Solving the Present Crisis and Managing The Leverage Cycle* (Yale University's Cowles Foundation for Research in Economics, Discussion Paper No. 1751, 2010) (providing a fully developed analysis of the role of leverage in the business cycle). Tobias Adrian & Hyung Song Shin, *The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-2009*, 2 ANN. REV. ECON. 603, 603-18 (2010) (examining the relationship between excessive leverage and asset bubbles).

[11] The Fed also tries to regulate the inflation rate by setting key interest rates, but regulation of the monetary aggregates has been an important tool for influencing the macroeconomy at various times historically. Bernanke Speech, *supra* note 2 ("In an amendment to the Federal Reserve Act in 1977, the Congress formalized the Federal Reserve's reporting of monetary targets by directing the Board to 'maintain long run growth of monetary and credit aggregates . . . so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.'").

provide credit to the economy can have the same effect that we would expect from a rapid expansion in the money supply. Moreover, the ability of the financial system to provide credit instruments dramatically increases as financial firms themselves rely heavily on debt or leverage. In this way, excessive leverage in the system as a whole has increased the effective supply of money and credit. And, I argue, repeated cycles of excess credit have caused multiple rounds of "inflation" that have shown up not as general increases in prices, but as "bubbles" in the prices of various classes of assets.

Asset bubbles are a major problem because they have significant and pernicious effects on the allocation of capital and the distribution of wealth and income in the real economy. In particular, when excessive leverage drives up asset prices, financial market participants who financed the investments in the assets, and others, may forecast further price increases. These forecasts serve to justify supplying more credit to investors in those asset classes, which help to further drive up prices in a self-fulfilling way. This flow of credit into the financing of certain asset classes helps fuel a pricing bubble. Participants in the process may be unaware that their actions, collectively, are having this effect—in fact, if they knew that the price increases they were observing were a bubble, presumably investors would be less willing to buy at inflated prices. However, it can be difficult for investors to identify a price bubble until it bursts.

Meanwhile, when prices of broad classes of assets go up generally, most investors experience themselves as making money by buying and selling such assets, and they may believe that the traders and money managers who help them manage their investments must be brilliant. Those who buy the assets grow richer by investing in the assets as the bubble develops, and even those who sell off the underlying assets to the more optimistic investors, get richer because they sell at inflated prices. Thus, inflation in asset prices creates the illusion that the financial sector is actually creating value for the economy as a whole as it invests in and trades those assets whose prices are being bid up. Investors then attribute the growth in their portfolio values to the skills of their money managers (and are willing to pay them well), when in reality, the cause is leverage-driven asset inflation.

The standard story about the causes of the financial crisis emphasizes that financial institutions were investing in "risky" assets. This is true in that it is always more risky to invest leveraged dollars than to invest unleveraged dollars, and many individual

investors and financial institutions were operating with extraordinarily high leverage by the mid-2000s. But what was it that made the investments so risky and simultaneously so attractive? Why were so many investors willing to turn their savings over to money managers who were operating in this risky way? Are most investors not risk-averse?

I argue below that, although investors are generally risk averse, they nonetheless may want to use high levels of leverage in boom times because leverage can boost the returns even on mediocre investments. For this reason, investors were repeatedly willing to turn resources over to people who work in the financial sector who were using high levels of leverage. Moreover, investors allowed financiers and money managers to pay themselves substantial wages and bonuses for creating and trading risky securities that involved so much leverage because investors perceived themselves as sharing in the high returns. As a result, leverage in the system as a whole allowed the financial sector to take a growing share of national income in the form of wages, salaries, fees and bonuses, causing compensation per employee in the financial sector to grow from $35,000 per year in 1980 (in inflation-adjusted 2009 dollars) to approximately $100,000 per year per employee (including secretaries and clerks) since 2002—a fourth sense in which the financial sector has become too large.

In other words, by generating inflation in the asset classes they were financing, participants in the financial sector were able, for an extended period, to show gains on the portfolios they were managing that appeared to more than offset the costs of their own compensation. Investors are more than happy to pay high fees, salaries, commissions and bonuses to financial market actors who arrange financing for them on good terms or help them get into investments that appear to be making money. As long as the bubble had not yet burst, the illusion of value creation therefore caused investors to accept higher leverage and to justify extraordinary compensation packages for the participants in the financial sector. In this way, bubbles tend to redistribute wealth and income to the people whose actions, collectively, are causing the financial bubble. This redistribution is not necessarily reversed when the bubble bursts. The creators of the bubble, in fact, keep much of the wealth and income they capture during each cycle of bubbles, even after the

bubbles burst.[12] In this way, cyclical instability in the financial markets acts as a one-way ratchet for financial sector compensation, and a bubble-prone economy is an economy in which the distribution of income and wealth is likely to be widening.[13]

How much distortion in the distribution of income and wealth has resulted from repeated cycles of bubble and burst in the financial markets? We do not have a wholly accurate way to measure bubbles, but consider what gross domestic product ("GDP") would have been in 2007, the last year before the recession, if the financial sector's share of GDP had stayed what it was in 1980. The National Income and Product Accounts ("NIPA") show that, at its peak in 2007, the financial and insurance sectors accounted for 7.9% of GDP. This compares with 4.9% in 1980. In other words, the financial sector captured three percentage points more of GDP—about $412 billion worth—in 2007 than it had in 1980. This is equivalent to a transfer of about $1365 from every person in the U.S. in 2007 to the financial sector and to the people who work in that sector.

Meanwhile, much of the value we thought the economy created in the mid-2000s turned out to be illusory—value that went away when the bubble burst. The Pew Financial Reform Project

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[12] As Nelson Schwartz and Louise Story reported recently, hedge fund managers were paid hundreds of millions of dollars, even in the disastrous year of 2008, and were capturing billions of dollars per year again by 2009. Nelson Schwartz & Louise Story, *Pay of Hedge Fund Managers Roared Back Last Year*, N.Y. TIMES, Apr. 1, 2010, at B1 ("But in a startling comeback, top hedge fund managers rode the 2009 stock market rally to record gains, with the highest-paid 25 earning a collective $25.3 billion . . . beating the old 2007 high by a wide margin.").

[13] Steven N. Kaplan & Joshua Rauh, *Wall Street and Main Street: What Contributes to the Rise of the Highest Incomes?* 33-35 (Ctr. Research Sec. Prices, Working Paper No. 615, 2007) (discussing the rise in compensation for Wall Street executives and corporate lawyers and concluding that this rise contributes to the rise in the United States' income disparity); Thomas Philippon & Ariell Reshef, *Wages and Human Capital in the U.S. Financial Industry: 1909-2006* 29-31 (Nat'l Bureau of Econ. Research, Working Paper No. 14644, 2009) (concluding that deregulation and corporate finance have played a causal role in increased wages and educational attainment for financial sector workers); Thomas Philippon, *The Evolution of the U.S. Financial Industry from 1860 to 2007: Theory and Evidence* 26-27 (N.Y.U., Nat'l Bureau of Econ. Theory, Center for Econ. Policy Research, 2008), *available at* http://pages.stern.nyu.edu/~tphilipp/papers/ finsize.pdf ("This paper argues that the role of Finance in economic activity varies over time, and that this is reflected in the income share of the financial sector.").

estimates that from September 2008 through the end of 2009, the U.S. GDP was $648 billion lower as a result of the financial crisis than it otherwise would have been.[14] In addition, some $3.4 trillion in apparent real estate wealth had disappeared, and another $7.4 trillion in apparent stock market wealth had also been lost.

Finally, one of the most troubling aspects of the fact that the financial sector takes such a large share of total national income and wealth is that wealth captured by financiers (or by any special interest group) can be used to influence policy and resist reform. In this way, income inequality, as well as a bubble-prone economy, may perpetuate itself because principals in the financial industry have much greater access to the halls of power in Washington and greater influence over regulatory agencies.[15]

The Dodd-Frank Act, passed by Congress in the summer of 2010, gives various regulatory bodies the authority and some of the tools they need to begin actively regulating some parts of the shadow banking system that were previously outside their reach. But regulators, especially the Federal Reserve and the Federal Deposit Insurance Corporation ("FDIC"), are taking their cues from the Basel Committee, an international organization that coordinates bank regulations across the leading countries. The Basel Committee has put forward a proposed set of principles that, if implemented, could begin to tighten controls on leverage.[16] It remains unclear, however, whether regulators will have the political will to set and enforce standards that are tough enough to get leverage under control.

II. Explosion in Financial Innovation

The financial system in the United States is vastly different today from what it was three or four decades ago, with many more

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[14] Phillip Swagel, *Cost of the Financial Crisis: The Impact of the September 2008 Economic Collapse*, at 9 (Pew Econ. Policy Group, Fin. Reform Project, Briefing Paper No. 18, 2010), *available at* http://www.pewfr.org/project_reports_detail?id=0033 ("The difference between the CBO forecast and the actual outcome for GDP comes to a total of $648 billion in 2009 dollars for the five quarters from the beginning of October 2008 to the end of December 2009, equal to an average of $5,800 in lost income for each of the roughly 111 million U.S. households.").

[15] *See infra*, at 44-47.

[16] See discussion of the status of Basel Committee efforts in Part VIII below.

institutional players, offering different kinds of savings vehicles, credit vehicles and financial services. This section explains six significant innovations in the financial sector that, collectively and individually, led to less transparency, less regulation, more leverage and more risk.

A. Money Market Funds

Many of the changes that are important to this story have their roots in the period of high inflation in the U.S. in the 1970s.[17] At that time, banks were restricted in terms of the interest they could pay on deposits. With inflation exceeding 10% by the end of the decade, individual and institutional investors were interested in finding safe alternatives to deposits that would pay attractive interest rates. Financial institutions responded by developing "money market mutual funds."[18] Money market mutual funds are not insured by the FDIC like deposit accounts at banks, but they were backed by large and seemingly highly-secure financial firms as well as regulated by the SEC (which regulates all mutual funds). Money market funds are also required to hold relatively safe short-term instruments such as Treasury bills, certificates of deposits (issued by banks) and commercial paper.

These new vehicles for savings were important because they provided highly liquid assets for investors that could, like "money" in cash or checking accounts, be readily spent on investment or on consumption. These funds, however, were managed by institutions that were not regulated by the FDIC. Data from the Federal Reserve show that in December of 1974, there was only about $1.6 billion invested in money market mutual funds (both retail and institutional) in the U.S., which compared with about $902 billion of so-called

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[17] J. Bradford De Long, *America's Only Peacetime Inflation: The 1970s* 2 (Nat'l Bureau of Econ. Research, Historical Working Paper No. 84, 1996) (discussing causes and nature of 1970s inflation).

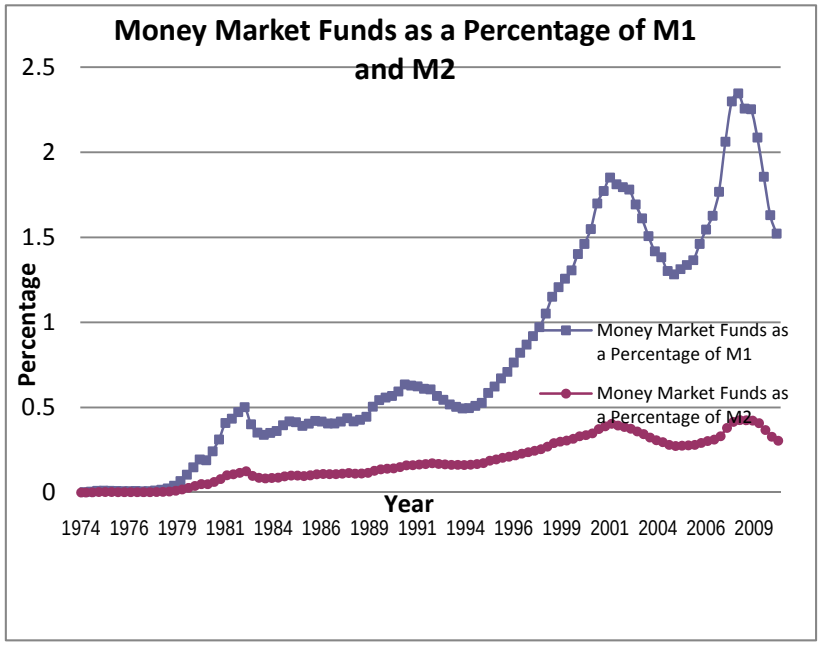
[18] A "money market mutual fund" (also called a "money market fund") is a type of mutual fund that is required by law to invest in low-risk securities, such as short-term bonds. ELLIE WILLIAMS, INVESTOR'S DESK REFERENCE 172 (2001) (detailing features common to money market funds). By contrast, a "money market deposit account" is an account available at banks that earns interest at a rate set by the bank based on rates available in money markets. *Id.* at 171. Money market deposit accounts usually impose limits on the ability of customers to make withdrawals, so they are not as liquid as checking accounts. *Id.*

"M2", which measures all currency, checking accounts, travelers' checks, small time deposits and savings accounts at banks and depository institutions, bank CDs and retail money market mutual funds. [19] Figure 1 below shows how the dollar value of money market mutual funds has grown since then as a percentage of M1 (currency, checking accounts and travelers' checks only) and M2. The aggregate value of money market funds peaked at about 230% of M1, and 43% of M2 in the spring of 2008.[20]

[19] Retail money market mutual funds (those available to small investors) are included in the Fed's measure of "M2," but institutional money market funds (those available to corporate and institutional investors) are not. BD. OF GOVERNORS, FED. RESERVE SYS., THE FEDERAL RESERVE SYSTEM: PURPOSES & FUNCTIONS 22 (2005) [hereinafter BD. OF GOVERNORS] (explaining what categories of accounts and financials the Fed uses to compute the various measures of the money supply). Institutional money market funds were included in the Fed's broader measure of money, "M3," until the Fed stopped measuring M3 in early 2006. BD. OF GOVERNORS, FED. RESERVE SYS., STATISTICAL RELEASE H.6: MONEY STOCK MEASURES: DISCONTINUANCE OF M3 (2005), http://www.federalreserve.gov/releases/h6/discm3.htm.

[20] Money invested in money market mutual funds has declined somewhat relative to M1 and M2 since mid-2008, partly because M1 and M2 have grown as the Fed has added money to the economy to help stave off recession, and also because nervous investors moved funds out of money market mutual funds and into instruments they believe are safer such as insured bank accounts (part of M1 or M2) or into short-term Treasury securities.

Fig. 1. Growth of Money Market Funds



Source: Author's calculations based on Bd. of Governors, Fed. Reserve Sys., Flow of Funds Accounts of the United States, Tables L.121 and H.6. More details on file with author.

As is suggested by this figure, money market mutual funds (both retail and institutional) are now a major part of the "shadow banking system" in the U.S., a vast system by which savings of individuals and short-term assets of business are aggregated and credit is provided to individuals and businesses outside the channels of traditional banking.

B. Junk Bonds

A major financial market innovation of the 1980s was the use of high-yield "junk" bonds to finance leveraged buyouts. "Junk" bonds are bonds that are rated below investment grade (BB or lower) by credit rating agencies. Leveraged buyouts ("LBOs") were so-named because they were transactions in which an investor or group of investors ("LBO entrepreneurs") bought all or controlling interests in the equity of publicly-traded companies to take the companies

private. The investors paid for their purchases with money borrowed by using the expected cash flow of the acquired firm as collateral, and they planned to pay off the debt by restructuring and dismantling the firms, sometimes retaining a valuable core of the business. The LBO entrepreneurs were often able to borrow as much as 90% or more of the purchase price, a previously unheard of degree of leverage in corporate financing outside of the banking system itself.

Because the leverage used was so high, some or all of the bonds issued by the buyers to finance the acquisition were considered quite risky. Therefore, the bonds paid an unusually high interest rate, giving them their polite name of "high-yield bonds" and their pejorative name of "junk bonds." The advantage to issuing firms of using junk bonds was that the firms were able to bypass banks and raise money without subjecting themselves to the oversight that a bank would (presumably) insist on if the firm borrowed the money from the bank. Moreover, most banks would not have loaned money at all to firms with leverage ratios (debt/total assets) of 90% or more. Investors have been willing to buy these securities for their portfolios, on the other hand, because they believed that a substantial part of the default risk associated with these securities could be "diversified" away[21] (although the willingness of investors to invest in junk bonds varies greatly between good times and bad times). Although leveraged buyout activity subsided, junk bonds have continued to be important financing tools for the corporate sector in the U.S., representing 8.9 percent of all corporate offerings in 1999, and 6.6 percent of all corporate offerings—some $210 billion worth—in 2009.[22]

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[21] One of the leading proponents of using junk bonds to finance takeovers was Michael Milken, at Drexel Burnham Lambert, who argued that junk bonds were good investments for investors because the risks associated with junk bonds could be diversified away. DAVID HENDERSON, ESSAYS IN PUBLIC POLICY: THE TRUTH ABOUT THE 1980S 21 (1994) ("Research by economists, which the entrepreneurial junk-bond dealer Michael Milken trumpeted to his customers, showed that lenders could hold a diversified portfolio of such bonds and earn a higher return, even adjusted for the risk of default, than they could earn by holding investment-grade bonds."). In the last decade, the illusion that the default risk of junk bonds could be diversified away was enhanced through the use of "securitization" of these bonds and derivative products that were supposed to offset remaining risk. See sections below on securitization and derivatives.

[22] Bryan Keogh, *Junk Bonds Capture Record Share of Sales as Yields Decline: Credit Markets*, BLOOMBERG, Apr. 9, 2010, http://www.bloomberg.

Junk bonds played a niche role in the financial market crisis of 2007-2009. Many regulated financial institutions, such as banks, money market funds and pension funds, are not allowed to invest in junk bonds because they are, by definition, below "investment grade." Thus in recent years some financial market players have constructed portfolios of junk bonds and "securitized" these portfolios by selling new securities backed by the portfolio of junk bonds. The cash flows on a portfolio of bonds can be divided up in such a way that some of these secondary securities are classified as very safe. This means that banks, insurance companies, money market funds and pension funds are permitted to hold them. Recent estimates indicate that as much as $700 billion of high-yield corporate debt is currently outstanding and will come due and need to be paid off or refinanced from 2012 through 2014.[23]

C. Private Investment Funds

An important financial innovation in the 1990s and 2000s was the development of private investment funds such as venture capital funds, private equity funds and "hedge" funds. Private investment funds operate outside the regulated part of the financial sector. They can do so because they only accept investments from wealthy individuals and financial institutions that are considered to be sophisticated investors ("qualified purchasers") under the terms of the Investment Company Act,[24] which regulates mutual funds and other investment companies that are open to investment by less sophisticated individual investors. Venture capital funds specialize in providing financing for start-up companies and firms that do not yet

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com/apps/news?pid=20601009&sid=aXd7tp95rlLA ("Global sales of junk bonds were $210 billion in 2009, or 6.6 percent of all corporate offerings, Bloomberg data show. The previous high was in 1999 at 8.9 percent. In the U.S., companies have sold $74 billion of high-yield debt—rated below Baa3 by Moody's Investors Service and less than BBB- by S&P—a record 22 percent of the overall market, compared with 13 percent in 2009.").

[23] Nelson D. Schwartz, *Corporate Debt Coming Due May Squeeze Credit*, N.Y. TIMES, Mar. 16, 2010, at A1 ("The result is a potential financial doomsday, or what bond analysts call a maturity wall. From $21 billion due this year, junk bonds are set to mature at a rate of $155 billion in 2012, $212 billion in 2013 and $338 billion in 2014.").

[24] Investment Company Act of 1940, 15 U.S.C. §§ 80a-2(a)(51), 80a-3(c)(7) (2010) (providing an exemption from regulation as an investment company for securities issuers whose securities are held by "qualified purchasers").

have sufficient cash flows or promise of profits in the future to be able to sell equity shares to the public. Private equity funds typically invest in large blocks of publicly-traded companies to get control, or they buy out the entire company to take it private and restructure it, with the idea of selling it back to the public again a few years later. Hedge funds specialize in investing in commodities, currencies and derivative securities. All of these classes of investments are potentially very high risk, and therefore many banks and regulated financial institutions are restricted in their ability to make such investments directly.

The U.S. government doesn't collect data on the private investment funds part of the financial sector, but Kaplan and Rauh report data from several consulting firms that indicate that, as of 2005, hedge funds had approximately $900 billion to $1 trillion under management, venture capital funds had about $26 billion and private equity funds had about $131 billion.[25] This compares with total financial assets in the commercial banking sector of about $9.844 trillion in 2005.[26] Participants in the private investment fund sector, especially hedge funds, were actively involved in the speculation and trading that led up to the financial crisis. The private investment fund sector has operated largely outside the reach of regulatory authorities, although, the Dodd-Frank Act provides that any such firm can be subject to regulation by the Federal Reserve if it is identified as posing a threat to the stability of the financial system.[27]

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[25] Kaplan & Rauh, *supra* note 13, at tbl.3a-3b (providing data on the amount of money under management within different types of investment pools).

[26] BD. OF GOVERNORS, FED. RESERVE SYS., FLOW OF FUNDS ACCOUNTS OF THE UNITED STATES, Table L.109, available at http://www.Federal reserve.gov/RELEASES/z1/.

[27] Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No 111-203, § 113, 124 Stat. 1398-1402 (2010) ("The Council, on a non-delegable basis and by a vote of not fewer than 2⁄3 of the voting members then serving, including an affirmative vote by the Chairperson, may determine that a U.S. nonbank financial company shall be supervised by the Board of Governors and shall be subject to prudential standards, in accordance with this title, if the Council determines that material financial distress at the U.S. nonbank financial company, or the nature, scope, size, scale, concentration, interconnectedness, or mix of the activities of the U.S. nonbank financial company, could pose a threat to the financial stability of the United States.").

D. Asset Securitization

One of the most important processes through which non-bank financial firms have taken over large parts of the financing activity that historically would have been done by banks had its start, ironically, in financial innovation by the U.S. government. This is the process of "securitization" of financial assets. Prior to the 1980s, banks that made loans to businesses or individuals usually held the loans in their own portfolios until the loans were paid off. In the 1970s, in an effort to make it easier for families to buy houses, the Government National Mortgage Association ("GNMA" or "Ginnie Mae") began buying mortgages from banks so banks could then reinvest the money they received for old mortgages in newly issued mortgages. GNMA formed portfolios or pools of mortgages that they purchased from banks and then sold securities based on the cash flow from these mortgages.

In the early days of securitization of mortgages, the securities offered a pro-rata share in the income from an entire bundle of mortgages backing the security.[28] By the late 1980s, when the Federal National Mortgage Association ("Fannie Mae"), and the Federal Home Loan Mortgage Corporation ("Freddie Mac") began securitizing mortgages, the securities were "tranched," meaning that they were structured so that some classes of securities were to receive the income from the mortgages that were paid off first, and other classes were to be paid only after the more senior classes were paid. If, in general, no more than 5% of a particular pool of mortgages would be expected to default, a claim on the first 50% of the mortgages to pay off would be very low risk because the default risk would all be concentrated on the securities whose claims are based on the second 50% of mortgages to be paid off (of which 10% would now be expected to default). The security that represents a claim on the first "tranche" of mortgages, then, might receive a high enough credit rating that regulated financial institutions would be allowed to invest in them.[29] Banks, in particular, were not required to

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[28] This structure, in which there are no classes of securities, and no priorities are established, is called "pass through securitization." Joshua Coval, Jakub Jurek & Erik Stafford, *The Economics of Structured Finance*, 23 J. ECON. PERSPECTIVES. 3, 5-6 (2009) (providing basic anatomy of collateralized debt obligations with specific attention to the tranching of the these products).

[29] Brunnermeier, *supra* note 7, at 78-79 (discussing rights of holders of debt in the 'super senior tranche' category).

hold as much risk capital relative to investments in securitized instruments as they would have been required to hold to be invested in the original loans.[30] In other words, they could invest in mortgage-backed securities ("MBS") on a more highly leveraged basis than they could when investing directly in mortgages.

Once the model of securitizing mortgages was fully developed, banks and investment banks applied the idea to other classes of assets, such as automobile loans, credit card balances, insurance policies, corporate bonds, including junk bonds, student loans, equipment leases and small business loans. The general name for these securities is asset-backed securities ("ABS"). From 1995 through 2004, ABS amounts outstanding grew by 19 percent per year.[31]

From 2000 onward, the packaging and reselling of financial assets through securitization proceeded at an extraordinary pace. Financial institutions found that if they could sell off their loans as soon as they made them, they would capture the transaction fees for creating the individual loans and the servicing fees for serving as the collection agent for those loans. They could also quickly recover their investment dollars, enabling them to turn around and do it again, and again and again.[32] This process made a virtual avalanche of credit available to individuals and businesses.[33]

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[30] Rene M. Stulz, *Credit Default Swaps and the Credit Crisis*, 24 J. ECON. PERSPECTIVES. 73, 80 (2010) ("[F]inancial institutions generally were able to hold less regulatory capital if they packaged loans in securities and held them on their balance sheet than if they just kept the loans on their balance sheet. . . .").

[31] Tarun Sabarwal, *Common Structures of Asset-Backed Securities and their Risks*, 4 CORP. OWNERSHIP & CONTROL 258, 258-65 (2006) ("In nominal terms, over the last ten years, (1995-2004), ABS amount outstanding has grown about 19 percent annually.").

[32] The Securities Industry and Markets Association estimates that from 2002 through 2008, 55 to 60% of home mortgages were securitized, while around 30 to 35% of commercial mortgages, multi-family mortgages, and consumer credit were securitized. SECURITIES INDUSTRY & FINANCIAL MARKETS ASS'N, RESTORING CONFIDENCE IN THE SECURITIZATION MARKETS 37 (2008), http://www.americansecuritization.com/uploadedfiles/Restoring ConfidenceSecuritizationMarketsReport.pdf (providing data regarding the ratios of different mortgages that were securitized to overall mortgages written broken down by category of mortgage).

[33] Brunnermeier, *supra* note 7, at 78-79 ("The creation of new securities facilitated the large capital inflows from abroad. . . . Financial innovation

The repackaging of credit instruments through securitization made individual securities as well as whole classes of securities more opaque, in that it became difficult to assess the actual riskiness of the securities. The process of bundling ABSs together and issuing new securities based on pools of ABSs—called collateralized debt obligations ("CDO")—only exacerbated the problem. Even worse, at the peak of the bubble, some investment banking firms and other participants in the credit markets were actually creating so-called "synthetic CDOs," which were securities with no assets backing them that were designed, rather like fantasy-league baseball teams, to provide a payoff that mimicked a hypothetical portfolio of actual securities. Neither the seller nor the buyer of synthetic CDOs necessarily owned the underlying mortgages, or loans, or asset-backed securities on which the bet was based. Depending on the details of how they were structured, they could give the parties to the bet the same schedule of contingent gains or losses as if they were holding the actual assets, but with little or no money down, creating the possibility of an almost infinitely leveraged investment!

As it became increasingly difficult to evaluate the riskiness of layers of various securities, financial firms began adding insurance policies to the bundles to ensure that the credit rating agencies would still classify them as low risk. These insurance policies were designed to pay off if the assets underlying the securities went into default. These insurance policies were not called "insurance," however. They were called credit default swaps ("CDS"). This was important because if they had been classified as insurance contracts, they likely would have been regulated by insurance regulators at the state level in the U.S., and the sellers of the policies might have been required to hold sufficient collateral to be able to make good on their promises to pay in the event of default.[34] "Swaps," however, are a type of derivative contract, which I take up in the next section. Importantly, swaps were not regulated or traded on exchanges. The

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. . . led to an unprecedented credit expansion that helped feed the boom in housing prices.").

[34] Because CDS issuers were not required to hold much in the way of collateral for their potential obligations, the issuers of CDSs were also able to operate with extraordinarily high effective leverage. See discussion of leverage in parts II and III below.

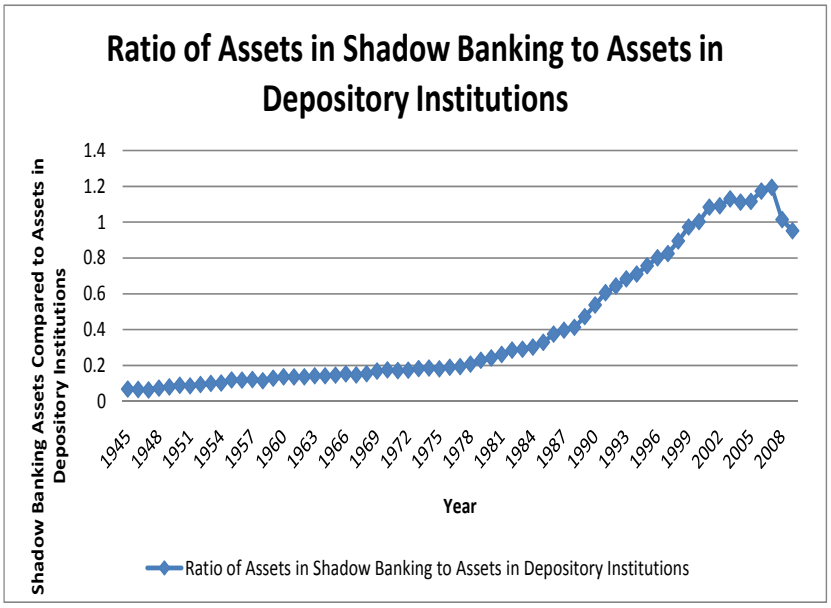
Dodd-Frank Act requires that all swaps suitable for clearing must be cleared through a central exchange.[35]

As the business of issuing and trading securitized credit instruments grew in the last couple of decades, several new categories of credit market institutions have become important, and the Federal Reserve has begun collecting aggregate data on the activities of these institutions. Figure 2 below shows the growth in assets in a subset of financial institutions in the "shadow banking

[35] § 723 of the Dodd-Frank Act (to be codified at 7 U.S.C. § 2) requires clearing and exchange trading for swaps to be regulated by the Commodity Futures Trading Commission ("'(1) IN GENERAL.—"(A) STANDARD FOR CLEARING.—It shall be unlawful for any person to engage in a swap unless that person submits such swap for clearing to a derivatives clearing organization that is registered under this Act or a derivatives clearing organization that is exempt from registration under this Act if the swap is required to be cleared.") and § 763 of the Dodd-Frank Act (to be codified at 15 U.S.C. § 78a *et seq.*) sets out parallel rules for swaps regulated by the Securities and Exchange Commission ("'(a) IN GENERAL.—"(1) STANDARD FOR CLEARING.—It shall be unlawful for any person to engage in a security-based swap unless that person submits such security-based swap for clearing to a clearing agency that is registered under this Act or a clearing agency that is exempt from registration under this Act if the security-based swap is required to be cleared."). Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No 111-203, §§ 723, 763, 124 Stat. 1675-82, 1762 (2010). MARK JICKLING & KATHLEEN ANN RUANE, CONGRESSIONAL RESEARCH SERVICE, THE DODD-FRANK WALL STREET REFORM AND CONSUMER PROTECTION ACT: TITLE VII, DERIVATIVES 5 (2010) ("Title VII of the Dodd Frank Act creates largely parallel clearing and exchange trading requirements for swaps and security-based swaps as those terms are defined by Title VII and will be further defined by the CFTC and the SEC."). Under the terms of the Dodd-Frank Act, an exchange will be created for trading of standardized swaps, and such swaps will be required to go through this exchange. These rules will not affect customized swaps, but such swaps must be reported to a trade repository or to the CFTC or SEC. WEIL, GOTSHAL & MANGES LLP, FINANCIAL REGULATORY REFORM: AN OVERVIEW OF THE DODD-FRANK WALL STREET REFORM AND CONSUMER PROTECTION ACT 11, *available at* http://www.weil.com/files/upload/NY%20Mailing%2010%20FRR%20100721%20Weil_Dodd_Frank_Overview_2010_07_21.pdf ("The cornerstone of [Dodd-Frank] with respect to derivatives is the centralized clearing requirement. Congress has mandated centralized clearing for all swaps that the CFTC or the SEC determines should be cleared through a registered clearinghouse, and that are otherwise accepted by one or more clearinghouses for clearing.").

system" that are active in securitizations,[36] relative to total assets in traditional depository institutions, including banks, savings institutions and credit unions. As is clear from this figure, growth in the securitization part of the shadow banking system took off during the 1980s, and by 2008 this subset of the financial sector accounted for substantially more in total assets than did traditional depository institutions.

Fig. 2: Growth in Assets in Shadow Banking System Relative to Assets in Banks



Source: Author's calculations based on Flow of Funds Accounts of the United States, Bd. of Governors, Federal Reserve System, Table L.1. Shadow banking assets is the sum of assets in government sponsored enterprises, agency- and GSE-

[36] These include government-sponsored enterprises such as Ginnie Mae and its cousins, Fannie Mae and Freddie Mac, plus a category called "Agency- and GSE-backed mortgage pools" which are specially-created entities that exist solely for the purpose of holding mortgages backed by GSEs and issuing the securities based on them. It also includes a category called "ABS issuers," which are similar to mortgage pools, but they hold other kinds of loans, such as student loans or credit card loans. Furthermore, it includes finance companies, like GE Capital, that are subsidiaries of non-bank corporations but that exist to provide credit to customers of GE. Finally, it includes brokers and dealers, including investment banks.

backed mortgage pools, ABS issuers, finance companies and brokers and dealers. Depository institutions assets is the sum of commercial banking, savings institutions and credit unions. More details on file with author.

E. Derivatives

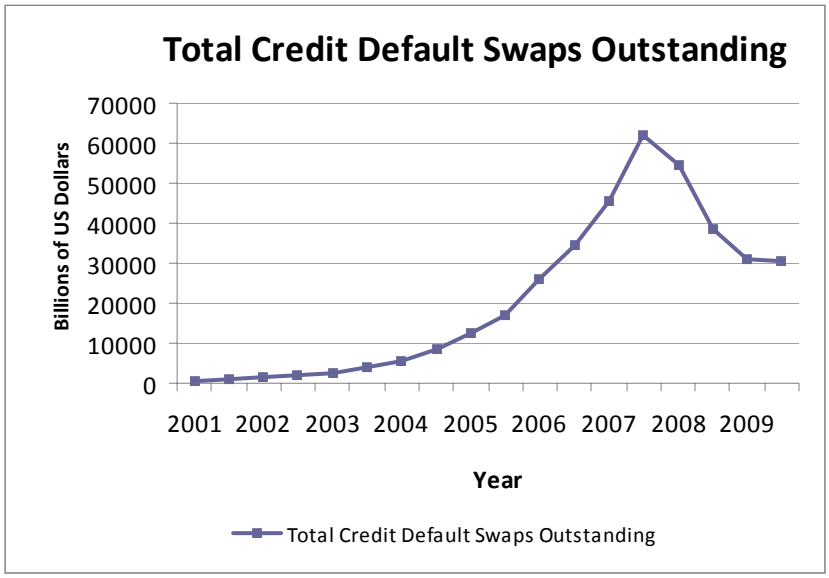
Since the mid-1990s, hedge funds have led the way in a massive expansion in issuing and trading derivatives. Derivatives are contracts whose value depends on some underlying asset. Such contracts are actually better understood as bets. Swaps and options, for example, are essentially bets that counterparties make among themselves about whether some underlying asset will decline in value, or increase in value.

Derivative transactions are usually explained as a mechanism for hedging other positions in the portfolios of one or both parties to the transaction. "Credit default swaps" ("CDS"), for example, were ostensibly sold to provide insurance for the holders of asset-backed securities ("ABS") and CDOs, so that if the underlying loans defaulted, the holder of the securities based on those loans would be protected.[37] Reliable records on CDS were not kept until 2001, and in that year, the notional value of all CDS at the end of the year was $919 billion (see Figure 3.). By the end of 2005, there were $17 trillion worth of CDS outstanding, almost twice the total amount of

[37] Because CDS supposedly provided such protection, banks that invested in MBS, ABS, or CDOs were not required to hold as much capital if the bank also held CDS protecting those instruments, so the availability of CDS made it possible for banks to leverage themselves even higher. BASEL COMM. ON BANKING SUPERVISION, INTERNATIONAL CONVERGENCE OF CAPITAL MEASUREMENT & CAPITAL STANDARDS [BASEL I] (1988) (determining risk-weighted capital requirements for loans backed by mortgages). *See also* Jeffrey T. Prince, et al., *Synthetic CDOs*, *in* FRANK J. FABOZZI & STEVEN V. MANN, EDS., THE HANDBOOK OF FIXED INCOME SECURITIES 696 (2005), *available at* http://halfchai.files.wordpress.com/ 2009/07/frank-j-fabozzi-the-handbook-of-fixed-income-securities-7the.pdf ("Under Basel I, banks must hold 8% regulatory capital against the par of assets that are 100% risk weighted. Most regulators will lower this regulatory capital requirement to 1.6% (20% of the 8%), where risk is transferred via a default swap as long as the swap counterparty is an Organization for Economic Cooperation and Development (OECD) institution. If the risk is transferred in a credit-linked note (CLN) format and the collateral for those notes is very high quality, such as Treasurys, the risk weighting could be even lower.").

household mortgage debt at the time.[38] At the peak of CDS activity, in 2007 (just before the financial market collapse), there were $62 trillion worth of CDSs outstanding—almost twice the total of all credit market assets held by the financial sector in the U.S.[39]

Fig. 3. Total Credit Default Swaps Outstanding (Billions of USD)



Source: International Swaps and Derivatives Association, "ISDA Market Survey."

This is evidence that some CDSs and other derivatives were not really being used to offset risk associated with holding some underlying debt instrument. No well-run insurance company would sell a homeowner $1 million worth of insurance on a $500,000 house because that would give the homeowner a huge incentive to burn the house down. The same logic should apply to the derivatives market.

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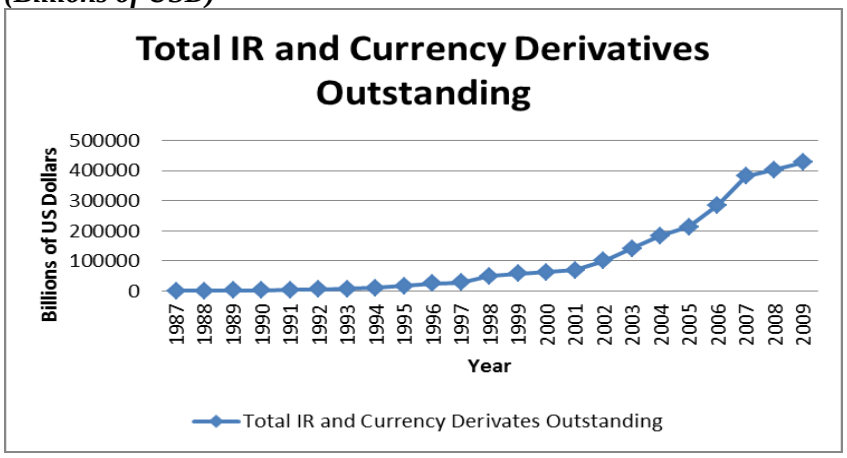
[38] Federal Reserve Flow of Funds Accounts, Table L.100 reports that in 2005, households and non-profit organizations had total house mortgage debt of $8.848 trillion. BD. OF GOVERNORS, FED. RESERVE SYS., STATISTICAL RELEASE Z.1: FLOW OF FUNDS ACCOUNTS OF THE UNITED STATES: 2005-2009 Table L.100 (2010).

[39] Federal Reserve Flow of Funds Accounts, Table L.1 reports that the financial sector of the U.S. economy held $36.535 trillion in credit market assets in 2007. BD. OF GOVERNORS, FED. RESERVE SYS., *supra* note 38, at Table L.1.

By the mid-2000s, however, many institutional investors that were buying CDS did not hold the underlying loans or mortgages, nor even any ABSs or CDOs based on them, in their portfolio. Some investors that did hold the underlying assets were vastly "over-insured."

The only way to make sense of what was happening is to understand that to "over-insure" is a way to place a bet which you win if some bad event occurs. In the mid-2000s, many financial market participants were using derivatives not so much to offset other risks but to place bets with each other about a whole variety of financial indicators and securities. By the mid-2000s, for example, there were vastly more currency and interest rate swaps outstanding than could possibly be needed to offset underlying risks in currency and bond markets that the bettors were actually bearing. In Figure 4, we see that, by 2007 there were nearly $400 trillion worth of other derivatives (interest rate swaps, currency swaps, interest rate options and equity derivatives) outstanding. Because derivatives permit an investor to bet on an underlying market with very little up-front commitment of funds, derivatives can be extremely highly-leveraged investments.

Fig. 4. Total Interest Rate and Currency Derivatives Outstanding (Billions of USD)



Source: International Swaps and Derivatives Association, "ISDA Market Survey."

F. "Repos"

"Repurchase agreements," nicknamed "repos" in the credit markets, are exchanges in which one party, usually a financial firm, sells a financial instrument to another financial firm at a discount to its market value, with a promise to buy the instrument back a short time later at its full market price. The difference between the price the seller gets and the price the seller will have to pay to buy the instrument back provides a return to the buyer for the use of the money during the intervening days. Thus, a repo is like a secured loan, in which the "borrower" puts some asset—such as a treasury security, bond, or CDO—into a collateral account until the borrower pays off the loan. An important legal difference between a repo and a secured loan is that in a repurchase agreement, legal title to the underlying security actually passes to the purchaser.[40]

Repurchase agreements can have terms of several months or more, but they have come to be used by financial firms for very short-term funding needs, especially for overnight borrowing. Repos have been regarded as very safe and liquid investments for banks and money market mutual funds because they are typically quite short-term, and the investor/lender can always take possession of the underlying asset if the seller/borrower defaults.

In the last few years leading up to the financial crisis, investment banks, brokers and dealers came to rely heavily on repos as a source of funding, with repos accounting for more than a third of total liabilities of brokers and dealers from 2005-2007.[41] Banks have also increasingly turned to repos as a source of investment funds to supplement deposits, with repos in some recent years accounting for as much as 9% of commercial bank liabilities.[42] Data on repos have been collected only sporadically, but the Bank of International Settlements estimates that the repo market doubled in size from 2002

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[40] The possibilities are more complicated than this summary suggests, since for some types of repos the security is held by a third party. These are sometimes called "tri-party repos." But those details are not necessary for my purposes in this essay.

[41] BD. OF GOVERNORS, FED. RESERVE SYS., *supra* note 38, at Table L.207.

[42] *Id.*

to 2007, when gross amounts outstanding totaled about $10 trillion each in the U.S. and Europe, and another $1 trillion in Britain.[43]

One of the factors that may have been driving the use of repos is that the accounting treatment of these transactions is somewhat flexible, depending on the details of the particular agreements. In cleaning up the September 2008 bankruptcy of Lehman Brothers Holdings, Inc., investigators uncovered evidence that Lehman Brothers classified large quantities of repos as "sales" transactions, rather than financing transactions, thereby hiding as much as $50 billion in effective debt both from the market and from regulators.[44] In late March of 2010, the Securities and Exchange Commission undertook a broad investigation of about two-dozen large financial and insurance companies to see if other firms have similarly been misusing repos to hide debt. In early April, the *Wall Street Journal* reported that at least 18 large banks, including Goldman Sachs Group Inc., Morgan Stanley, J.P. Morgan Chase & Co., Bank of America Corp. and Citigroup Inc. were understating their debt levels throughout 2009 and into 2010 by an average of 42%, mostly by engaging in repo transactions at the end of each reporting period in which they temporarily "sold" assets in exchange for cash.[45]

In the next section, I take up the question of how excessive leverage in the financial sector has been used to enhance profits, and in Section IV, I discuss how leverage helps to generate asset bubbles.

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[43] GARY B. GORTON, SLAPPED BY THE INVISIBLE HAND: THE PANIC OF 2007 44 (2010); Peter Hordahl & Michael R. King, *Developments in the Repo Markets During the Financial Turmoil*, 2008 BIS Q. REV. 37, 37.

[44] Fawn Johnson, *UPDATE: SEC Queries Large Institutions on Repurchase Agreements*, DOW JONES NEWSWIRE, Mar. 29, 2010 ("The SEC's inquiry follows recent revelations that Lehman Brothers Holdings Inc. allegedly used repurchase agreements to mask some $50 billion in debt before it collapsed in 2008.").

[45] Kate Kelly, Tom McGinty & Dan Fitzpatrick, *Big Banks Mask Risk Levels*, WALL ST. J., April 9, 2010 ("Major banks have masked their risk levels in the past five quarters by temporarily lowering their debt just before reporting it to the public. . . . A group of 18 banks—which includes Goldman Sachs Group Inc., Morgan Stanley, J.P. Morgan Chase & Co., Bank of America Corp. and Citigroup Inc.—understated the debt levels used to fund securities trades by lowering them an average of 42% at the end of each of the past five quarterly periods, the data show. . . .").

III. "Shadow Banking" in the Financial System

For the last three decades, the growth of activity in the "shadow banking system" has outpaced that of the banks and other depository institutions, so that, as we noted above, by 2007, assets in the shadow banking system had come to exceed those in the formal banking system by a wide margin.

In a 2008 speech, Timothy Geithner, then President and CEO of the Federal Reserve Bank of New York, reported some indicators of the growth of the shadow banking system:

> In early 2007, asset-backed commercial paper conduits, in structured investment vehicles, in auction-rate preferred securities, tender option bonds and variable rate demand notes, had a combined asset size of roughly $2.2 trillion. Assets financed overnight in triparty repo grew to $2.5 trillion. Assets held in hedge funds grew to roughly $1.8 trillion. The combined balance sheets of the then five major investment banks totaled $4 trillion. In comparison, the total assets of the top five bank holding companies in the United States at that point were just over $6 trillion, and total assets of the entire banking system were about $10 trillion.[46]

Adrian and Shin use data from the Federal Reserve, Flow of Funds, to report on some of the components of the shadow banking system and compare it to data on bank-based assets.[47] They find that at the end of 2007, bank-based assets totaled $12.8 trillion, whereas what they call "market-based institutions" had assets totaling $16.6 trillion.[48] Market-based institutions, as they use the term, means

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[46] Timothy Geithner, President & Chief Executive Officer, Fed. Reserve Bank of N.Y., Reducing Systemic Risk in a Dynamic Financial System (June 9, 2008), *available at* http://www.bis.org/review/r080612b.pdf.

[47] Adrian & Shin, *supra* note 3, at 1-5 (displaying several charts titled "US Flow of Funds, Federal Reserve" that compare the percentage of assets held by shadow banks compared with the percentage of assets held by commercial banks).

[48] *Id.* at 1 (displaying a chart comparing "bank based" total assets to "market based" total assets). These data suggest a ratio of assets of market-based

institutions that fund themselves by issuing securities (rather than by accepting deposits).[49]

This matters because the market-based institutions that Adrian and Shin refer to avoid many of the regulations that apply to banks. Two types of regulations in particular that apply to banks are important for this story. The first are "reserve requirements," and the second are "capital requirements." Reserve requirements determine how much of the funds that are deposited in banks by bank customers may be loaned out or invested to earn a return.[50] Capital requirements are more complicated in application, but they essentially determine what share of total assets must be financed with equity capital rather than with debt.[51] Both types of regulation matter for the "multiplier" effect that banking activity has on the effective supply of money (and credit) in the economy.

A. Reserve Requirements and the Money Multiplier

When banks receive deposits of money from their customers, they are normally eager to invest the money by making loans or buying securities, because the way that they make profits is to earn more on the loans and investments than they have to pay in the form

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financial institutions to bank asset of 1.3, which is close to the ratio I report in Fig. 2 the ratio of shadow banking assets to bank assets.

[49] Adrian and Shin's explanation of what they mean by "market-based institutions" corresponds to what I included as components of the "shadow banking system" in Fig. 2 above. *Id*. at 1 (displaying a chart breaking the components of "market based" banking into "ABS issuers, Broker Dealers, Finance Co., GSE Mortgage Pools, and GSE").

[50] Reserve requirements are determined by the Federal Reserve. "Reserve requirements are the amount of funds that a depository institution must hold in reserve against specified deposit liabilities. Within limits specified by law, the Board of Governors has sole authority over changes in reserve requirements. Depository institutions must hold reserves in the form of vault cash or deposits with Federal Reserve Banks." Board of Governors of the Federal Reserve, Reserve Requirements, http://www.federalreserve.gov/monetarypolicy/reservereq.htm (last visited Oct. 24, 2010).

[51] The Federal Reserve also determines capital requirements, but in a highly flexible way that specifies a target level of capital as a percentage of so-called "risk-weighted" assets. The targets that the Fed implements are influenced by international standards set by Basel Committee on Banking Supervision and the Bank of International Settlements. See further discussion of capital requirements below.

of interest on the deposits. But they are not permitted to loan out all of the deposited money. Instead, they are required by law to put a certain percentage of those deposits aside as reserves in the form of cash in the vault or as deposits in reserve accounts with the Federal Reserve. The rationale for this requirement is to make sure that the bank always has some cash available to pay out when their depositors write checks on their balances or want to make withdrawals. The amount that banks are required to keep as reserves is known as a "reserve requirement." Since the reserve requirement is a fraction of total deposits, we have what is called a "fractional-reserve banking system."

The reserve requirement can affect how much new money will be created by the banking system for every new dollar that the Fed injects into the economy. The Fed creates money in one of two ways—it creates currency by printing new bills and stamping out new coins and it increases the liquid funds available by purchasing the bank's Treasury securities with cash.[52] Once a bank has received cash for some of its securities, the bank will have excess reserves and can then loan out a fraction of that new cash. However, the total money available to lend is not limited to the first bank's loan. In a fractional-reserve system, the banking system multiplies the amount of new money. Here is how this works:

Suppose that Bank A receives $1,000,000 in new cash from the Federal Reserve. And suppose that the reserve requirement is 10%, meaning that the bank must hold at least $100,000 of the new cash in reserve. But Bank A can loan out the rest, or $900,000, which it does to Customer A.

Say that Customer A pays the $900,000 to a builder who has built a new McMansion for A. The builder then deposits her $900,000 into Bank B. Now Bank B has excess reserves, and can loan out 90% of the new deposits, or $810,000 to some Customer B. Customer B, in turn, spends the money, and those who receive the money deposit it into Bank C. Bank C thus receives $810,000 of new deposits, of which it can now loan out $729,000. The customer who receives the $729,000 again deposits it in some other bank, which can then loan out $656,100. Etc. When you repeat this process, the

[52] The Federal Reserve does not have to create actual currency in order to pay "cash" for the securities it purchases. Instead, it can increase the money that a bank has in its reserve account held by the Fed by simply making an accounting entry.

amount of money in circulation increases in a predictable way, as noted below:

Fed injection of cash into Bank A:	$1,000,000
New deposit into Bank B:	900,000
New deposit into Bank C:	810,000
New deposit into Bank D:	729,000
Etc:	
Total new deposits in banking system:	$10,000,000

The total sum of this infinite series is $1,000,000, divided by the reserve ratio, or in this case, $1,000,000/.1 = $10,000,000. In setting the reserve requirement, the Federal Reserve can generally control the amount of what it calls "M1" (cash plus checkable deposits plus travelers' checks) in the economy by controlling how much cash and reserves (cash plus bank reserves are called the "monetary base") it injects into the system. In this simple example, $1 million of new money in the monetary base results in $10,000,000 of new M1. The ratio of new M1 created for every new dollar in the monetary base is called the "money multiplier." In a fractional-reserve system with a 10% reserve requirement, in which the only way that money can be held in the private sector is in the form of checkable deposits, and in which banks always loan out as much money as they are entitled to loan out under the regulations, the money multiplier would be $10,000,000/$1,000,000 = 10.

In practice, the amount of money in the economy is multiplied by the action of banks as described above, but there are other factors at work so that the multiplier is less than 10. For example, many people hold money outside the banking system, in the form of cash (in cash registers in retail stores, for example). The multiplier can work only on the money deposited in banks. The money multiplier is also reduced if banks do not loan out or invest all of the money they would be entitled to loan out under the reserve requirement rules. In the wake of the financial crisis, many banks have been very wary about making new loans, so they have held on to new cash when they get it. This caused the money multiplier to collapse in late-2008, which has made it more complicated for the Federal Reserve to create enough new money to offset the sudden constriction of credit and liquidity in the system in 2008 and 2009.[53]

[53] The M1 money multiplier has been less than 1 since late 2008, meaning that when the Federal Reserve adds a dollar of cash or reserves to the

But in normal times, the M1 money multiplier (the ratio of M1 to the monetary base) is greater than 1, meaning that for every dollar of cash and bank reserves that the Federal Reserve creates and injects into the banking system, banks create more than $1 worth of checkable deposits, so that M1 expands by more than the additional dollar.[54]

As should be clear by now, while the Federal Reserve directly controls only the monetary base, in practice it has substantial influence over M1 through its control over the monetary base and its control over the reserve requirement. But M1 is no longer the only "money" in the economy. In practice, financial innovation has created new ways in which people and businesses can hold financial assets, or spend money, without actually handling cash or even writing checks on checkable deposits. An individual may have a home equity line of credit, for example, which enables her to borrow against the equity in her house, as needed. The homeowner could also make payments on the line of credit by setting up an automatic payment arrangement with her bank in which the bank takes assets out of the customer's savings or money market account at certain times each month. Businesses may have a line of credit with a bank or with a supplier, and the "payables" associated with that line of credit might even be settled from time to time by bank transfers from the business's accounts to those of the suppliers.[55] Large corporations and financial institutions also have important alternatives to checkable deposits where they can either lend or borrow for very short terms. Businesses can issue and sell "commercial paper," which are very short-term bonds, or raise money by selling securities

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banking system, less than a dollar of new M1 is actually created. This is an example of a classic Keynesian "liquidity trap." The Federal Reserve Bank of St. Louis keeps track of monetary aggregates and regularly posts data on the M1 multiplier. *See* Federal Reserve Bank of St. Louis, M1 Money Multiplier (MULT), http://research.stlouisfed.org/fred2/series/MULT (last visited Oct. 24, 2010) (showing a chart where the money multiplier is less than 1).

[54] Paul Krugman and Robin Wells state that the normal money multiplier is about 1.9, but in recent years, the multiplier has been trending downwards. PAUL KRUGMAN & ROBIN WELLS, MACROECONOMICS 395 (2d ed. 2009). An important reason for this is that a rising share of transactions taking place use such near-money instruments as money market funds and lines of credit, so that the economy needs less in the way of cash and checkable deposits for a given level of economic activity. See discussion infra.

[55] Payroll deposit plans are an example of this.

together with a promise to repurchase the securities in the "repo market." In many instances, especially in the case of individual consumers or small businesses, assets may have to flow through a bank checking account to pay off credit balances, but they may appear only very briefly as funds in a checkable account. Thus to understand how liquidity is supplied by the financial system, we need to also understand these other mechanisms, and how they influence economic activity.

In addition to M1, the Federal Reserve also tracks a broader measure of the money supply, called M2, which includes all of M1 plus time deposits, savings accounts, retail money market funds and bank CDs. Throughout the last half of the 20th century (until 2006), the Federal Reserve also tracked an even broader measure called M3, which included large time deposits, institutional money market funds and repurchase agreements. And we could easily imagine an even broader measure that might include credit card accounts, lines of credit, or commercial paper. What becomes clear as we think about these broader categories of what is sometimes called "near money," is that various forms of credit often serve as a substitute for money in the economy. While the Federal Reserve has significant influence over the narrow measures of money in the economy, it has much less influence over the supply of credit more generally, except through its influence on interest rates.

B. Leverage and the Supply of Credit

As discussed above, financial innovation has now created numerous alternative ways that investors can invest surplus funds and numerous ways that individuals and businesses can get credit that can almost completely bypass the banking system. In the last three decades, the supply of credit from outside the banking system has vastly outgrown the supply of money and credit made available by banks. This is clear from Figure 2 above, which shows the growth of assets in the shadow banking system relative to assets in traditional depository institutions.[56] The ratio of "shadow banking"

[56] Recall that the assets of a bank or other financial institution consist almost entirely of its financial investments, such as its portfolio of loans or securities, which are a source of credit for the "real" economy, where goods and services are created and exchanged. Thus the total assets of banks, or other financial firms, is a good measure of the amount of credit financial firms are supplying to the economy.

assets to banking assets was very small in the 1940s and early 1950s, but by the mid-1990s, it exceeded 1, and it has stayed well above 1 since then. This means that more total credit is available to the U.S. economy now through the five types of institutions tracked by the Federal Reserve that I have identified as heavily involved in securitization (finance companies, government-sponsored entities, mortgage pools, ABS issuers and brokers and dealers) than through banks.

Although the total amount of *money* that banks can create (in the form of additional checkable deposits) is constrained by the reserve requirement that banks face, the total amount of *credit* (including near money instruments) that banks and other financial institutions can create is constrained ultimately not so much by the reserve ratio, but by the ability of these institutions to raise capital from sources other than bank deposits—by borrowing, selling debt securities, or selling stock. With these other sources of finance capital, a key factor limiting aggregate credit is the degree to which the institutions may be "leveraged."[57]

Leverage is a measure of the degree to which an institution relies on debt rather than equity for financing. Sometimes it is measured in terms of the ratio of total debt to total assets of the borrowing firm, and sometimes as the ratio total assets to equity. In the banking sector, banks not only face reserve requirements, they also face what are called "capital" requirements.[58] Capital requirements, to oversimplify, determine the amount by which a bank's total assets (cash plus loans or other investments) must exceed its liabilities (deposits, plus any borrowing in credit markets).[59] Capital requirements determine how much of a financial

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[57] A key distinction between reserve requirements and capital requirements is that reserve requirements are designed to ensure that a bank maintains enough of its assets in highly liquid form that it can pay out money to depositors on demand. The capital requirement is intended to ensure that the bank stays solvent—that the value of its assets always exceeds its liabilities.

[58] Outside of the regulated banking sector, capital levels have not historically been regulated, although prior to the financial crisis, most economists believed that the market would impose constraints by refusing to lend to institutions that were already too highly leveraged.

[59] "Capital" is a term of art in the bank regulatory world, and capital requirements are very complex. Douglas J. Elliott, *A Primer on Bank Capital,* THE BROOKINGS INST., 1-2 (Jan. 28, 2010), http://www.brookings.edu/~/media/Files/rc/papers/2010/0129_capital_elliott/0129_capital_primer_elliott.pdf ("Capital is one of the most important concepts in banking. . . . [I]t can be

cushion, over and above its liabilities, a bank must have, or, conversely, how leveraged it can be. In the U.S., bank regulators have the authority to require banks to satisfy capital requirements in addition to reserve requirements, but capital requirements have varied and have been applied in complex ways over the years.

Since 1974, the U.S. has participated in international efforts through the Bank of International Settlements and the Basel Committee on Bank Supervision to coordinate capital requirements across countries. Under the so-called Basel I agreement, reached in 1988, internationally active banks in the G10 countries were supposed to hold minimum capital levels determined by a rather complex formula. To oversimplify, the requirement called for banks to hold capital equal to up to 8% of assets.[60] Capital requirements under Basel I never had the force of law, but bank regulators in the U.S. have used the various Basel agreements as guidelines for regulating bank capital.

A subsequent international agreement was negotiated in the late 1990s and early 2000s. The new agreement, Basel II, announced in 2004, created a more complex system for determining the risk weights on assets, as well as for the classification of assets as capital.

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difficult for those outside the financial field to grasp."). This is because, for regulatory purposes, some kinds of long-term debt, as well as equity, may count as "capital." And banks may also raise funds by issuing hybrid securities such as "preferred shares," which will count as capital. Also, capital requirements are applied only to assets that are considered risky. If a bank holds U.S. Treasury securities, for example, those are considered to be riskless and liquid, so banks are not required to hold any capital to support such assets. Thus, in the regulatory world, capital requirements are stated in terms of the ratio of "regulatory capital" to "risk-weighted assets."

[60] BASEL COMM. ON BANKING SUPERVISION, *supra* note 36 ("The committee confirms that the target standard ratio of capital to weighted risk assets should be set at 8% (of which the core element will be at least 4%)."). The requirement under Basel I called for banks to hold what is called "Tier 1" capital equal to at least 4% of risk-weighted assets, and total capital (the sum of "Tier 1" capital and "Tier 2" capital) equal to at least 8% of risk-weighted assets. To determine risk-weighted assets, each asset was assigned to a risk category, and capital requirements were determined on an asset-by-asset basis. DANIEL K. TARULLO, BANKING ON BASEL: THE FUTURE OF INTERNATIONAL FINANCIAL REGULATION 55-59 (2008) (discussing how capital would be broken down into both Tier 1 & Tier 2, and that both combined had to be at least "8 percent of risk-weighted assets," and also explaining how to assign each asset into one of five distinct categories based on the asset's risk level).

It allowed the largest banks to use their own internal models to determine the risk classification of many assets, and it relied more on supervisory review as well as the hope that markets will provide some discipline to rein in the amount of leverage a bank uses. Although early drafts of the agreement proposed new rules that would have had the effect of increasing capital requirements, under the agreement ultimately reached, many banks were able to reduce the total amount of capital they held.[61] The U.S. never fully implemented Basel II,[62] but in practice, banking regulators often permitted banks to have significantly less than 8% of their assets in equity capital. The Basel Agreement is undergoing significant revision now, in the wake of the financial crisis, and it should play a significant role in how regulators approach the problem of regulating leverage in the financial sector in the months and years ahead, a subject I will return to in Part VIII below.

In the years leading up to the financial crisis, banks and other financial institutions raised a growing amount of the funds for lending by borrowing in the "credit markets"—such as by issuing commercial paper, selling asset-backed securities, or entering into repurchase agreements. For financial institutions, leverage is often the key to profitability. To understand this, consider a home-buyer who gets a 90% mortgage to buy a $100,000 house. With a large mortgage like that, the home-buyer only has to have $10,000 in cash to buy the house. Moreover, if the house goes up in value by 5%, from $100,000 to $105,000 during the first year after the buyer moves in, he will have $15,000 in equity at the end of the year—a 50% return on the initial $10,000 investment. Of course, if the house declines in value by only 5%, the equity in the house falls by 50%. A mere 10% decline in the value of the house would completely wipe out the homeowner's equity in his house.

More generally, if investors think the underlying assets are likely to rise in value, they will see it as highly profitable to use as much leverage as the markets will allow them to use, so that they can

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[61] TARULLO, *supra* note 60, at 59-130, provides an extended discussion of the political and economic issues that arose in response to Basel I and Basel II.

[62] Elliot, *supra* note 59, at 11 ("[B]asel II rules have a number of explicit . . . calculations . . . to capture operational risk. U.S. regulators have not adopted this portion of Basel II and consequently do not use these calculations.").

invest as much as possible in those assets.[63] Beyond that rationale, leverage has become important in the financial sector because competitive pressures from various kinds of non-bank institutions that offer bank-like services, as well as from international banks, have helped to keep margins low on many bank services. Thus to improve their returns on capital, banks attempt to increase the amount of assets they manage and services they provide for any given level of regulatory capital. If a financial institution can borrow enough in the credit markets, it can greatly increase its total assets, which can drive up its expected return on equity. In good years, when the value of the institution's investments rises, its shareholders earn high returns. In fact, even a very small return on total assets for the institution as a whole can still provide a high return on equity if the institution is sufficiently leveraged. In bad years, shareholders in highly-leveraged financial firms may take a big hit, and could even be wiped out. But if shareholders are diversified and if failures of financial institutions are random,[64] on average, investors will earn more if the institutions are highly leveraged.

For this reason, banks have financed a growing share of their total assets by borrowing in the credit markets, and other types of financial institutions have also ratcheted up their borrowing. Figure 5 below measures the aggregate ratio of credit market debt to credit market assets of banks, savings institutions and credit unions (all depository institutions). This ratio has climbed from less than .02 (2%) prior to the 1960s (when banks relied almost entirely on deposits), to more than .16 (16%) by the late 2000s.

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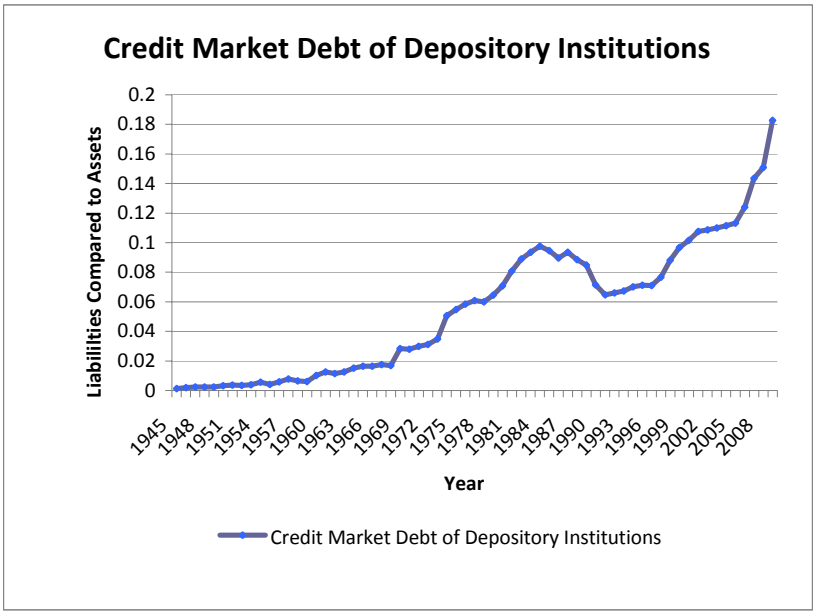
[63] Wilmarth estimates that household mortgage debt nearly quadrupled, from $2.7 trillion in 1991 to $10.5 trillion in 2007. *See* Arthur E. Wilmarth, *The Dark Side of Universal Banking: Financial Conglomerates and the Origins of the Subprime Financial Crisis*, 41 CONN. L. REV. 963, 1009 (2009) ("Household mortgage debt nearly quadrupled between 1991 and 2007, rising from $2.7 trillion to $10.5 trillion.").

[64] This is a big "if." The principle behind the idea of reducing risk through diversification requires that returns on the various investments in a portfolio are not correlated with each other. It turned out that investments in housing, while distributed across geographic markets, price ranges, and credit risks, were still highly correlated with each other, so that diversification within the category of housing investments did not eliminate or even substantially reduce default risk. Coval, Jurek, & Stafford, *supra* note 27, at 15-17.

Fig. 5: Reliance of Banks and Other Depository Institutions on Credit Market Financing.



Source: Authors' calculations from Federal Reserve Flow of Funds data, Table L.1. Credit market debt owed by the commercial banking sector divided by credit market assets held by the commercial banking sector. More details on file with author.

Figure 6 plots the total leverage (total liabilities divided by total assets) of U.S. depository institutions, compared with the total leverage of the five shadow banking sectors used to calculate the data in Figure 2.[65] In this figure, we see that the aggregate leverage of depository institutions has actually declined from what it was during the late '70s and early '80s, and is now somewhat below .9 (90%).[66]

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[65] For purposes of this analysis, I am measuring aggregate leverage in the financial system using data from the Federal Reserve for assets and liabilities in the financial sector. I make no attempt to report the more complex measure of regulatory capital as a share of risk-weighted assets that regulators would focus on.

[66] The aggregate amount of leverage of depository institutions in the U.S. hit very high levels in the 1980s because depositors sought to move large amounts of savings out of banks and thrifts and into money market mutual funds which paid higher rates of interest. Meanwhile, depository institutions, especially savings and loans, could not liquidate assets, which

But while the aggregate leverage ratio for the banking sector has declined, as measured by Flow of Funds data, this does not give the full picture. An important reason why banks and other depository institutions have been able to reduce their leverage ratios (or increase their capital ratios) is that they have developed ways to get assets and associated liabilities off the balance sheets of the regulated parts of their operations. Many of these assets are now being financed by securities issued by so-called "special purpose entities" or "special purpose vehicles" ("SPV") or "special investment vehicles" ("SIV") or sometimes "conduits," created by banks, finance companies, investment banks, government sponsored entities and brokers and dealers for the sole purpose of holding the assets and issuing the special securities.[67]

Asset-backed securities, derivatives and special purpose entities enabled banks and other financial institutions to create what Michael Simkovic calls "hidden leverage."[68] "Hidden leverage" techniques were considered advantageous for these institutions because they made it possible for the institutions to borrow at more attractive rates by hiding their existing debts and creating an exaggerated appearance of creditworthiness. Simkovic reports that

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included mortgages and other long term loans, fast enough to offset the decline in deposits. Many savings and loans and a number of banks failed during this period. Leverage in the depository institution sector was brought down after 1988, at least partly in response to Basel I. TARULLO, *supra* note 60, at 67 ("A Working Party on Bank Capital and Behavior established to evaluate the impact of Basel I as the committee began the Basel II exercise concluded that the average capital level had risen from 9.3 percent in 1988 to 11.2 percent in 1996.").

[67] Achara and Schnable assert that "the economic rationale for setting up conduits has always been to reduce capital requirements imposed by bank regulation." *See* Viral V. Acharya & Philipp Schnabl, *How Banks Played the Leverage "Game"?*, Nov. 21, 2008, *available at* http://w4.stern.nyu.edu/salomon/docs/crisis/Leverage_WP_Final.pdf. Similarly, Jeremy Stein observes that "it has become apparent in recent years that another important driver of securitization activity is regulatory arbitrage—a purposeful attempt by banks to avoid the constraints associated with regulatory capital requirements." Jeremy C. Stein, *Securitization, Shadow Banking, and Financial Fragility*, May 6, 2010, *available at* http://www.esri.go.jp/jp/workshop/100624/100624_Stein_2.pdf.

[68] *See* Michael Simkovic, *Secret Liens and the Financial Crisis of 2008*, 3 AM. BANKR. LAW J. 253, 253-56 (2009) ("[T]he financial crisis involves . . . collateralized debt obligations and credit default swaps. . . . [T]he roots of the financial crisis . . . [were caused by] hidden leverage.").

securitization can sometimes reduce interest rates by 150 basis points compared with a similar secured loan.[69]

The Federal Reserve Flow of Funds data account for some of this kind of financing through two new subsectors of the financial sector labeled "Mortgage Pools," and "ABS Issuers." "Mortgage pools" is a category that is really more like an accounting entry in the Flow of Funds data in that it has an aggregate leverage ratio of 1 by construction. ABS Issuers are separate legal entities, such as the "special purpose entities" mentioned above. They have an aggregate leverage ratio of 1 or somewhat higher than 1. While ABS issuers and other special purpose entities are legally separate from the sponsoring institutions that create them and sell their securities, during the financial crisis, the big banks or investment banks that sponsored them generally stood behind the securities issued by the entities. Apparently for reputational reasons, when such entities began failing during the financial crisis, the big banks often took them back onto their balance sheets.[70]

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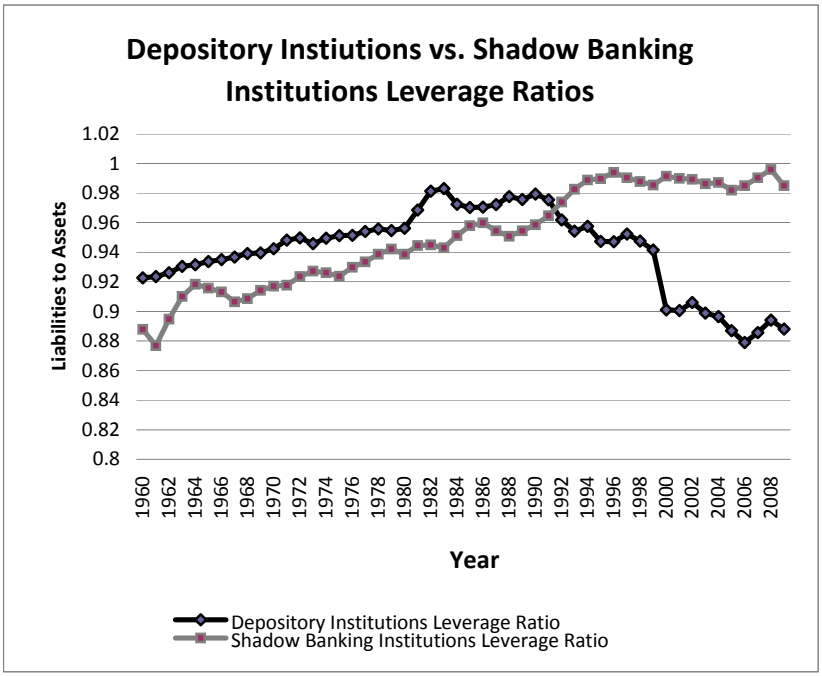
[69] *Id.* at 264 ("Securitization can reportedly lower interest rates by 150 basis points compared to an equivalent secured loan.").

[70] "What is striking about these shadow-banking vehicles is that many of them operated with strong guarantees from their sponsoring banks. And indeed, when the SIVs and conduits got into trouble, the banks honored their guarantees, stepping up and absorbing the losses." Stein, *supra* note 66, at 6; *see also* Dan Gallagher & Simon Kennedy, *Citigroup Says It Will Absorb SIV Assets*, MARKET WATCH, Dec. 14, 2007, http://www.marketwatch.com/story/citigroup-to-take-49-bln-of-siv-assets-onto-balance-sheet (reporting CitiGroup's announcement that it "will take $49 billion worth of assets from several investment vehicles that have been damaged by the credit market crisis and add them to its own balance sheet."); Neil Unmack & Sebastian Boyd, *HSBC Will Take on $45 Billion of Assets From Two SIVs*, BLOOMBERG, Nov. 26, 2007, http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a96W_ouLIr4g (observing HSBC's bailout of Cullinan Finance Ltd. and Asscher Finance, Ltd., two structured investment vehicles it created). Acharya and Schnabl claim that "the vast majority of assets in SIVs were taken back on bank balance sheets." Acharya & Schnabl, *supra* note 66.

Fig. 6: Leverage Ratios of Banking (Depository Institutions), and Shadow Banking Sectors.



Source: Authors' calculations from Flow of Funds Accounts of the United States, Bd. of Governors, Federal Reserve Sys.,Tables L.109, L.114, L.115, L.124, L.125, L.126, L.127 and L.129. More details on file with the author.

When we aggregate the liabilities and assets of the five sectors that are key players in the shadow banking system (reported in Figure 6), and take the ratio to get a sense of the aggregate amount of leverage in the shadow banking system, we see that it is close to 1, and has been since the mid-1990s. Thus, with a growing share of financial assets financed by highly levered shadow banking institutions, the effective leverage in the system as a whole rose to about .94, or 94% by the time the financial crisis began to unfold. This is equivalent to a capital ratio of only 6% for the combined system in the U.S. (the banking system plus the shadow banking

system),[71] substantially lower than the 8% capital ratio recommended under Basel I.[72]

IV. The Macroeconomics of Shadow Banking: Why Leverage Matters

The aggregate amount of leverage in the financial system as a whole has not previously been a factor that regulators and macroeconomic policy makers have paid much attention to,[73] although, as noted before, regulators at both the national and international level have tried to establish international capital standards for banks. Leverage matters at the level of individual financial institutions because leverage magnifies both percentage gains relative to equity and percentage losses relative to equity in the institution. Leverage also affects that probability that an institution will be able to repay all of its creditors. Thus, investments made in highly leveraged institutions or by highly leveraged institutions are inherently more risky than the same investments would be if they were made to or by an institution with a much higher share of equity capital.

Leverage also matters for systemic reasons. Leverage adds riskiness to the economy as a whole because it magnifies spillover

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[71] As I am using these ratios here, the capital ratio plus the leverage ratio equals 1 or 100%, by construction.

[72] This may also understate the amount of leverage that major banks and investment banks were using, to the extent that financial firms did not consolidate the debt of their SIVs, or to the extent that "repo" transactions enabled banks to temporarily sell assets and add cash for the last few days of each reporting period. In the spring of 2010, investigators at the Federal Reserve Bank of New York found that at least 18 major banks were engaging in this practice during 2009. *See* BD. OF GOVERNORS, FED. RESERVE SYS., STATISTICAL RELEASE Z.1: FLOW OF FUNDS ACCOUNTS OF THE UNITED STATES: 2005-2009 Table L.100 (2010). Numerous insiders have reported that major investment banks and other players in the shadow banking system were operating with 30 to 1 leverage ratios or more in the years leading up to the crisis. *See, e.g.*, Robert A. Johnson, *Reform and its Obstacles*, THE AM. PROSPECT, Apr. 26, 2010, *available at* http://www.prospect.org/cs/articles?article=reform_and_its_obstacles ("On the eve of the crisis, leverage ratios of 30 to one and beyond were commonplace.").

[73] The emphasis on capital ratios through the Basel process has primarily been about the safety and soundness of individual financial institutions, especially systemically important institutions.

effects—if one institution comes up short in its ability to repay one loan, then very likely it will also be unable to repay other loans that it has taken out. Moreover, if Bank A cannot repay the money it owes to Bank B, this may mean that Bank B will be unable to repay some of its loans if Bank B was also highly leveraged. This in turn may increase the probability that Bank C or D will be unable to repay their loans if they have loaned money to Bank B. Thus, in a financial system in which most of the participants are highly leveraged, a bad loan is highly contagious. Problems with liquidity or solvency at one set of borrowers can spill over to other lenders and their customers. For this reason, the degree of leverage of any given institution may not truly be a private matter between it and its investors, because there may be social costs that fall on outsiders when an institution is over-leveraged.

Leverage also adds risk to the economy for another reason that has to do with what I will call the "credit multiplier" effect of leverage. To make this clear, imagine that we have a financial institution, which I will call a "bank," that has a 25% capital requirement.[74] And suppose this bank has $25 in equity capital, and $75 worth of deposits. To keep the math simple, and so that we can focus on the effect of the capital ratio, we will also ignore the effect of any reserve requirement our "bank" may face. This gives it a balance sheet that looks like panel A of Figure 7 below, in which $25 of equity plus $75 of liabilities (such as deposits) finances $100 of total assets. If the capital requirement for this bank is now reduced to, say 10%, the bank can substantially grow its balance sheet. Its $25 in equity can now be paired with $225 in liabilities, to support $250 in total assets. In this way, "capital" in a financial institution can finance total assets worth 1/(capital requirement) times capital. With a 10% capital requirement, banks can finance assets worth 1/.1 = 10 times the dollar amount of capital in the banks. If financial institutions are allowed to operate with only 5% of capital (or less), those institutions can finance 20 or more times that amount of total assets.

[74] For purposes of this analysis, I am using the concept of capital requirements in a very simplistic way to mean, essentially, the ratio of equity to total assets.

Fig. 7. The "Credit Multiplier."

Panel A
25% Capital Requirement

Assets	Equity
$100	$25
	Liabilities
	$75

Panel B
10% Capital Requirement

Assets	Equity
$250	$25
	Liabilities
	$225

If the capital requirement declines for all the banks in an economy at the same time, so that they are all trying to increase the size of their balance sheets, you might ask where they will all be able to get the additional loans that can enable the banks in Figure 7 to acquire the additional assets and expand their balance sheets? In fact, you should also ask where the additional assets will come from. If a financial system with a 10% capital requirement suddenly becomes a financial system with only a 5% capital requirement overnight, where would the additional debt capital and assets come from to allow the whole system to expand its balance sheets?

One answer to that question is that financial institutions would happily lend money to each other (because a loan to Bank A by Bank B is an asset on Bank B's balance sheet; and Bank B also wants to expand, so it is happy to borrow money from Bank C to loan to Bank A, etc.). Of course, one may think that the banks in the aggregate cannot all make money if all they are doing is borrowing from and lending to each other.[75] So, in addition to simply buying

[75] Although it may sound crazy, in the years leading up to the financial crisis, there is good reason to believe that a substantial part of the rapid expansion of balance sheets in the financial sector was the result of institutions essentially borrowing and lending to each other. Adrian and Shin observe, for example, that "expanding assets [of financial institutions] means finding new borrowers," and that securitization allowed "banks and other intermediaries to leverage up by buying each other's securities." Adrian & Shin, *supra* note 10, at 616. To be sure, trading a certain amount of assets and liabilities with each other can create value. In this simplified model, for example, we have not introduced any of the messy realities of a

each other's securities, the financial institutions in which the capital requirement declines will probably also try to provide as much new financing to the real side of the economy as they can. This new financing could be used to create new assets (such as to build new houses, or start new businesses). Thus a lower capital requirement in the system as a whole would probably lead to some expansion in the real economy.[76] A lower capital requirement is thus expansionary in the same way, and for the same reasons, that an increase in the money supply is expansionary.[77]

But if credit expands in the financial sector faster than the real economy can respond by creating new assets, some of the expansion of credit might be used by investors in the real economy to

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real economy, in which some assets are riskier than others, and some loans are for a short term while others are for longer term. In a real economy, the financial sector can add value by matching parties who have surplus savings with parties who need cash and trading securities until the relevant risks fall on those who are best situated to bear the risk. Of course, institutions can also simply create and trade securities to collect the fees or for the sheer thrill of the gamble. When we look at the total notional value of credit default swaps in existence just before the credit market froze up (Fig. 3 above), it certainly suggests that something like thrill-seeking was going on.

[76] Adrian and Shin suggest that leverage is the "forcing variable" in financial firms (rather than the passive outcome of investment decisions), and that they expand or contract their balance sheets to achieve the preferred leverage level. Adrian & Shin, *supra* note 10, at 608 ("[E]quity appears to play the role of the forcing variable, and the adjustment in leverage primarily takes place through expansions and contractions of the balance sheet rather than through the raising or paying out of equity. We can understand the fluctuations in leverage in terms of the implicit maximum leverage permitted by creditors in collateralized borrowings transactions. . . .").

[77] The theory I am articulating about the role of leverage in economic expansion is similar to a theoretical approach referred to by macro-economists as the "bank-lending channel." *See, e.g.*, Ben S. Bernanke, Chairman, Fed. Reserve Sys., Speech at the Credit Channel of Monetary Policy in the Twenty-First Century Conference, The Financial Accelerator and the Credit Channel (June 15, 2007), *available at* http://www.federal reserve.gov/newsevents/speech/bernanke20070615a.htm ("The theory of the bank-lending channel holds that monetary policy works in part by affecting the supply of loans offered. . . . [B]y affecting banks' loanable funds, monetary policy could influence the supply of intermediated credit."). Among contemporary macroeconomists, efforts by the Federal Reserve to expand money and credit in the economy as a whole is referred to as "quantitative easing."

bid up the prices of existing assets. A very rapid expansion of bank credit, especially one in which the growth of credit is concentrated in certain sectors of the economy, might even cause serious inflation in some categories of assets—in other words, a rapid expansion of credit might cause "asset bubbles."

Thus we see that the capital requirement in a financial system, or its inverse, the degree of leverage allowed in the system, works in a way that is analogous the reserve requirement in the banking system. A fractional reserve requirement permits the banking system to create cash and checkable deposits ("M1") that are a multiple of the amount of any new cash and reserves that the Federal Reserve injects into the banking system; and in a similar way, a fractional capital requirement permits a financial system to create total credit in the system that is a multiple of the amount of equity capital supplied by investors.

Moreover, just as a rapid expansion of money (whether we consider "M1" or "M2" or some other measure of money) in the economy can cause generalized inflation, if a financial system rapidly expands the amount of credit it is supplying to the economy, this could also cause inflation (or a bubble), especially in the asset classes that are being financed by the new credit.[78]

It should not be too surprising that credit can be multiplied in an economy in a way analogous to the way money is multiplied and that a credit expansion can have effects that are very similar to a monetary expansion. As we have seen in the discussion above about

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[78] Geanakoplos also argues that an increase in leverage in the financial system can cause asset bubbles, but the mechanism he identifies is somewhat different. John Geanakoplos, *Solving the Present Crisis and Managing The Leverage Cycle* 3-7 (Cowles Found., Discussion Paper No. 1751, 2010) ("With markets stable . . . lenders are happy to reduce margins and provide more cash. . . . Good . . . news . . . also encourage[s] declining margins which in turn cause the massive borrowing that inflates asset prices still more."). He models the degree of leverage at the level of individual transactions or securities as the total value of the security or investment, divided by the amount of cash down that that the purchaser must pay. He observes that when leverage is "loose," investors can buy assets with only a small down payment. Asset prices will be driven up in this environment, he says, because optimistic buyers "can get easy credit and spend more." *Id.* at 2. The point I am making in this paper would end up in the same place if I adopted the Geanakoplos mechanism, but I adopt the money supply analogy because it helps to highlight what happens when there is a general expansion in credit.

substitutes for money in a modern economy, and about the various ways that the Federal Reserve measures the money supply and the various components of the money supply, there is really no bright line that separates what we call "money" from other forms of credit. What monetary authorities call M1 is just the most liquid, most immediately spendable types of assets: cash, checkable bank deposits and travelers' checks. M2 includes all of this plus other categories that are almost as liquid, including funds in savings accounts, and retail money market mutual funds. The next broader aggregate, what was called "M3" when the Federal Reserve still measured it, included all of M2, plus large time deposits, institutional money market mutual funds and repurchase agreements. In other words, M3 included several categories of assets that are highly liquid but not immediately spendable, some of which are created in the shadow banking system where limits on leverage have been much looser, rather than in the banking system.

The idea that money is credit and that credit—especially very short-term sources of credit—is a form of money has been neglected in recent years by scholars and policy-makers in the fields of finance and macroeconomics.[79] One indication that this idea has been neglected is the very fact that the Federal Reserve, which is responsible for regulating banking, and which has a goal of encouraging full employment and preventing inflation, stopped measuring M3 in early 2006. At the time that it announced that it

[79] Macroeconomists and macroeconomic policy makers are giving renewed attention to this idea lately, however, Adrian & Shin, *supra* note 10, at 616, observe that, "[i]n a market-based financial system, banking and capital market developments are inseparable, and fluctuations in financial conditions have a far-reaching impact on the workings of the real economy." Adrian and Shin also observe that prior to 1980, the literature on monetary policy focused on the relationship between monetary aggregates and the supply of credit in the economy, but "with the emergence of the market-based financial system, the ratio of high-powered money to total credit (the money multiplier) became highly unstable. As a consequence, monetary aggregates faded from both the policy debate and the monetary policy literature. However, there is a sense in which the focus on balance sheet quantities is appropriate. The mechanisms that have amplified fluctuations in capital market conditions are the fluctuations in leverage and the associated changes in haircuts in collateralized credit markets." *Id.* at 615. A "haircut" is the term of art for the percentage discount that an asset seller will have to give the asset buyer on the front end of a "repo" transaction. It is a measure of leverage.

would no longer collect and report the data necessary to measure M3, the Federal Reserve issued a Statistical Release that announced this change, and explained merely that "M3 does not appear to convey any additional information about economic activity that is not already embodied in M2 and has not played a role in the monetary policy process for many years."[80] Yet M3 might have been an important window on what was going on in the markets for very short-term credit in the months and years leading up to the crisis, especially in the market for "repos," which froze up almost completely in the fall of 2008.[81]

There are a few economists who have continued to estimate and report an estimate of M3 since the Fed quit measuring it. Figure 8 below was borrowed from the website of John Williams, who has made a living in recent years by collecting data and providing his own estimates of many statistics that the federal government estimates, such as inflation, GDP and money supply growth. Here, Williams reports the Fed's measures of the annual change in M1, M2 and M3, with the M3 series ending in early 2006, and Williams' own estimates for M3 growth continuing after that through early 2010.[82]

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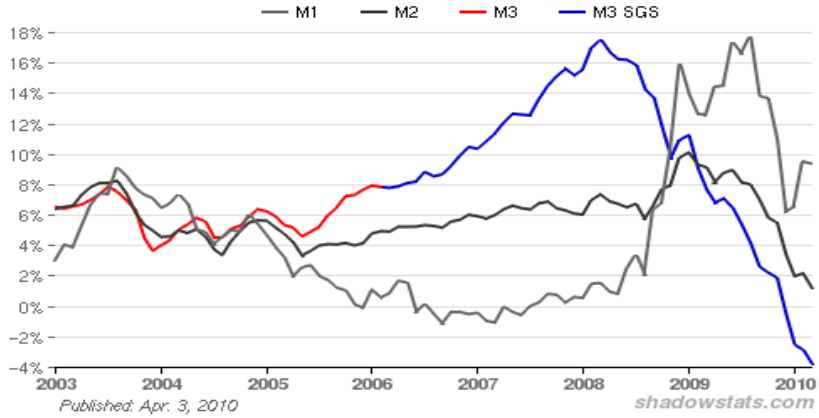
[80] BD. OF GOVERNORS, FED. RESERVE SYS., *supra* note 18.

[81] Gary Gorton similarly speculates that if the Federal Reserve had continued to monitor M3, it might have anticipated the bubble and responded earlier. "The repos included in the old money measure of M3 were narrowly those done only by the limited number of primary dealers that are approved to do business with the Fed. The [whole] repo market . . . was much broader and was not included in M3 or indeed measured at all. If this broader repo market had been included, presumably M3 would have been on a steep upward trajectory that would have been noticed and questioned. But this did not happen. Instead, about a year and a half after the calculation and publication of M3 ceased, the Panic of 2007 erupted in the much broader repo market. In other words, the shadow banking system was so far off the radar screen that instead of increasing the coverage of the repo counted for M3, the calculation was discontinued." GORTON, *supra* note 43, at 176.

[82] *See* John Williams, *Money Supply Charts*, SHADOW GOV'T STATISTICS, http://www.shadowstats.com/alternate_data/money-supply-charts (last visited Oct. 29, 2010) (showing a chart that is duplicated in this article as Fig. 8). I do not know how accurate Mr. Williams's measure of M3 is, but other economists who have attempted their own measures of M3 report data that looks substantially similar. *See, e.g.*, NOWANDFUTURES BLOG, http://blog.nowandfutures.com (displaying different blog comments, some related to M3.)

Fig. 8. Annual U.S. Money Supply Growth—SGS Continuation



Source: John Williams, ShadowStats.com, available at http://www.shadowstats.com/alternate_data/money-supply-charts, April 3, 2010.

These data suggest that M3 was growing at an explosive rate in the years and months leading up to the financial crisis. I suspect that the rapid growth rate was being driven by activity in the securitizations and "repo" markets, only some of which would have been picked up and measured even if the Fed had continued measuring M3. But it seems to me that the problem was not that M3 was not providing valuable information, but that M3 was not picking up some of the most important information. Rather than discontinuing M3, the Fed might have done better by continuing to measure M3, and beginning to collect and report a broader measure of money and credit that we might call "M4" that would provide a much better window onto activities in the "shadow banking system."[83]

Williams' estimates for M3 also suggest that it would be valuable for other reasons for the Fed to track what is happening to broader measures of money and credit. Note that, in Fig 8, we see that when the crisis hit in the second half of 2008, the growth rate of M3 quickly collapsed, and by the end of 2009, it had fallen below zero (meaning that the supply of M3 in the economy was shrinking). It has stayed below zero well into 2010. We also see that one of the Fed's responses to the financial crisis was to expand M1 as fast as it

[83] Gorton seems to endorse this view as well. "It is not only that M3 did not capture the right measure of money because it did not measure the full extent of the repo market, it is also that currently we do not know what the money supply really is either." GORTON, *supra* note 43, at 177.

could. We see in Figure 8 that the growth rate of M1 goes from negative in mid-2007, to as much as 16 to 18% per year in 2009. Many pundits and commentators have watched what has happened with M1 and have expressed concern that the Fed's actions will lead to inflation in the months and years ahead.[84] Yet, if Williams' numbers are correct, this suggests that broader measures of the money supply were still declining well into 2010, which would be contractionary, perhaps even deflationary, rather than expansionary. Measures of the money multiplier also suggest that, even with the Fed pumping money into the economy to unfreeze the credit markets and stave off the recession, broad measures of the money supply were declining rather than growing in mid-2010. The Fed is trying to be expansive but can't push money into the system fast enough to completely offset the contractionary effects of the effort by financial institutions to "deleverage."[85]

In sum, leverage matters because leverage determines the amount of new credit that financial institutions can create, and credit, like money (which is really the same thing), provides the grease that keeps the economy humming. Supplying enough of that grease is important to a well-functioning economy, but providing too much too fast probably causes asset bubbles, generalized inflation, or perhaps both. Excessive credit also exposes the economy to crashes

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[84] AnnaMaria Andriotis, *Will Federal Reserve Policies Cause Inflation?*, SMART MONEY, Apr. 6, 2010, http://www.smartmoney.com/investing/stocks/market-update-tuesday-apr-6-2010-21798/ ("[A] growing concern is whether inflation is around the corner."). Warren Buffett, Op-Ed., *The Greenback Effect*, N.Y. TIMES, Aug. 18, 2009, at A27 (discussing how the large current account deficit will need to at least be partially financed by printing money, thereby causing inflationary risks).

[85] By late summer of 2010, economists were debating whether the U.S. economy would experience a "double dip" recession, accompanied by deflation, and what the policy response should be to prevent such an outcome. *See, e.g.*, Simon Constable, *Economist Shiller Sees Potential for 'Double Dip' Recession*, WALL ST. J., Aug. 28, 2010, *available at* http://online.wsj.com/article/SB10001424052748704147804575455370525902224.html ("Robert Shiller, professor of economics . . . said he thought the second dip down of the so called double-dip recession 'may be eminent. . . .' [H]e thinks the U.S. economy is 'teetering on the brink of deflation.'"). *Chances of Double Dip Now Over 40%: Roubini*, CNBC, Aug. 26, 2010, http://www.cnbc.com/id/38863025. ("The chances of a double-dip recession are now more than 40 percent. . . . [T]he biggest threat to the economy is deflation. . . .").

when institutions decide they must reduce their leverage. To get an idea of how severe these problems can be in an economy in which leverage ratios are extremely high in the financial sector, note that if the financial sector is required to hold 8% of its assets in capital, it can support 12.5 times the amount capital in total assets on its balance sheets. But if the required capital ratio falls to 6%, the same institutions will now try to carry 16.7 times the amount of capital on their balance sheets. With a capital ratio at 4%, financial institutions would want to carry 25 times the amount of capital on their balance sheets, at 3%, 33 times, and at 2%—a level that a number of large institutions reached going into the financial crisis—an institution will try to grow its balance sheet to 50 times the amount of capital it has.

More generally, once capital ratios get very low, small changes in target capital ratios result in very large changes in the amount of total assets that financial institutions want to hold. If the ratio is allowed to drop a bit, institutions scramble to make more loans or buy more assets, which will add fuel to any asset bubble already underway. And if institutions suddenly have to reduce their leverage, they can be forced to reduce the size of their balance sheets dramatically, even disastrously. The result is substantial systemic instability in financial markets.

We don't have a direct way to measure whether the amount of credit supplied to an economy at any point in time is the right amount or perhaps too much. But the amount of debt held by the financial sector (which is credit to the rest of the economy) in the U.S. economy relative to GDP has more than doubled in the last three decades, going from $2.9 trillion, or 125% of GDP in 1978, to $36 trillion, or 259% of GDP in 2007.[86] During the same period, the supply of money, as measured by M1 and M2, declined as a share of GDP, with M1 going from 16% of GDP in 1978 to 10% of GDP in 2007 and M2 going from 60% of GDP in 1978 to 54% in 2007.[87] This is just another way of showing that a substantial part of the expansion in credit in the economy in the last three decades must have happened outside of the banking system, where M1 and M2 are created.

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[86] JOHNSON & KWAK, *supra* note 5, at 59.

[87] Author's calculations from Federal Reserve Statistical Release, H.6, Money Stock Measures, Table 1. BD. OF GOVERNORS, FED. RESERVE SYS., STATISTICAL RELEASE H.6: MONEY STOCK MEASURES: HISTORICAL DATA Table 1 (2010).

In the next part, I argue that the "shadow banking system," in which leverage ratios are not restricted, has strong tendencies to create too much credit.

V. Excessive Credit and the Rollercoaster Economy

So far, I have argued that a financial system that can create too much credit is likely to produce a real economy that is prone to asset pricing bubbles. We have lately experienced just how devastating the cycle of bubble and burst can be on the lives of most working people. The bubble part of the cycle feels good. Unemployment is low, wages are growing, more people are able to buy houses and take vacations and government revenues are increasing, making it possible to provide more services that people want. But, like a rollercoaster, the higher it goes on the way up, the more precipitous the slide back down and the harder the crashes when they come. Numerous articles and studies have documented the costs of the financial market crisis and worldwide recession of 2008-2009. The Pew Economic Policy Group Financial Reform Project, for example, estimates that 5.5 million American jobs were lost, and U.S. households lost an average of almost $5,800 each in income from September of 2008 through the end of 2009 due to the decline in GDP.[88] The stock market lost $7.4 trillion in that same period, and 500,000 more homes were foreclosed in that period than had been predicted by the Congressional Budget Office just prior to the crash in September 2008.[89]

And these only measure effects in the U.S. Millions more jobs were lost overseas. Unemployment at the end of 2009 was almost as high (9.9%) in the Euro area as it was in the U.S. at the same time (10%), and in some European countries such as Ireland, Spain and several Eastern European countries the unemployment rate was above 12% at the end of 2009.[90] The Asian Development Bank estimates that global financial assets, including stocks, bonds and

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[88] Swagel, *supra* note 14, at 10-11.
[89] *Id.* at 14, 17.
[90] *Harmonized Unemployment Rate by Gender*, EUROSTAT, http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=teilm020&tableSelection=1&plugin=1 (last modified Oct. 29, 2010).

currencies, fell in value by more than $50 trillion in 2008, the equivalent of an entire year of global GDP.[91]

One reason that the crash has been so bad is that, when financial institutions get overleveraged, the process of deleveraging is more painful the more overleveraged the institutions were in the first place.[92] This is due to the problems previously mentioned. When leverage is high to begin with, small changes in leverage can produce very large swings in the total value of assets that financial institutions hold, and if one loan goes bad, it can spill over to cause other loans to go bad. A bad loan at one bank is more likely to cause problems at other banks the more highly leveraged the first bank is. To illustrate this with a simplified example, consider again the bank illustrated in Figure 7, only now assume it has a ratio of debt to total assets of 98%.[93] This means its balance sheet would look like the following:

Assets	**Equity**
$1250	$25
	Liabilities
	$1225

Here we see that our bank has total liabilities (including deposits) of $1,225, which, together with the original equity capital of $25 supports $1,250 in total assets, for a 98% leverage ratio. Now suppose that the assets consist of twenty-five loans, with a payoff value of $50 each. Furthermore, suppose that one of those loans

[91] Shamin Adam, *Global Financial Assets Lost $50 Trillion Last Year, ADB Says*, BLOOMBERG, Mar. 9, 2009, http://www.bloomberg.com/apps/news?pid=20601068&sid=aZ1kcJ7y3 LDM.

[92] In time series data for the U.S. economy, Adrian and Shin observe that peaks in leverage among leading banks ("primary dealers") are associated with the onset of financial crises. Adrian & Shin, *supra* note 10, at 609 ("Financial crises tend to be preceded by marked increases in leverage and are subsequently followed by sharp deleveraging.").

[93] There were rumors that numerous Wall Street firms may have been this highly leveraged at the beginning of the crash in 2008, and there seems to be widespread agreement that "haircuts" in the market for asset-backed securities (essentially the amount of down payment required to purchase the securities) were "on the order of 2%." Stein, *supra* note 66, at 8. Geanakoplos presents data showing that the down payments required on subprime and alt-A mortgages in 2006 was only 2.7%. Geanakoplos, *supra* note 10, at 13.

defaults and the bank is required to "write off" the total value of that loan, leaving the bank with only $1,200 in assets.

Note that once this happens, all of the shareholders' equity has been wiped out, and the bank is insolvent—it has $1,225 worth of liabilities and only $1,200 worth of assets. This means that the bank will have to default on one or more of its loans, or it might be unable to pay depositors if they rush to withdraw their deposits. If the bank is a traditional regulated bank, the Federal Deposit Insurance Corporation (FDIC), which provides a guarantee for depositors, might take over the bank, preventing depositors from making a run on the bank to get their money back.

But if the bank had been heavily financed with short-term loans (such as repos), the various lenders to the bank are likely to get nervous; they will not want to allow the bank to refinance its short-term loans or continue to borrow. In fact, the bank might be in default on some of its loans already because its assets have declined. Thus, the bank may be forced to sell some assets so that it can pay off some loans and restore its balance sheet. If numerous other banks are experiencing the same kinds of problems, they will all be trying to sell assets at the same time. This is likely to drive down the value of those assets in the market, so the bank could find that it has to take another write-down of its assets. A further write-down means that the bank must default on more of its loans, which causes other banks to write down more of their loans to our initial bank. In this way, the crisis quickly spreads to other institutions.

My point here is that even if the banks in this economy were all merely lending to and borrowing from each other, the whole system is more vulnerable to financial crisis the more leveraged all of its participants are. In fact, the decision that each financial institution makes about how leveraged it will be involves something of a prisoner's dilemma:[94] each institution will be better off—more profitable on average—if it uses more leverage,[95] but all of the

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[94] A prisoners' dilemma is a model in game theory which is structured so that if individual participants "rationally pursue any goals . . . all meet less success than if they had not rationally pursued their goals individually." *Prisoner's Dilemma*, STANFORD ENCYCLOPEDIA OF PHILOSOPHY, Oct. 22, 2007, http://plato.stanford.edu/entries/prisoner-dilemma/.

[95] Leverage improves returns for shareholders on average because shareholders capture all of the upside gain if the investments work out, but if the investments don't work out, shareholders are protected on the downside because they have "limited liability." Shareholders take the first hit when

institutions together may be worse off if the system as a whole is more leveraged.[96] This is because there is likely to be more "systemic" risk in the economy as a whole if most financial institutions are highly leveraged.

In fact, however, it is more complicated than this because there is an offsetting effect of greater leverage in the system as a whole. To the extent that higher systemic leverage drives asset price inflation, as I have argued above in Part IV, most institutions will not only be better off if they use higher amounts of leverage, they may also be better off if other institutions use more leverage—at least as long as price levels are still on their way up. This is because aggregate leverage, not just individual leverage, drives asset inflation, and rising asset prices tend to make the decision by an individual institution to use leverage look that much smarter in retrospect. So if Bank A borrows $1,225 to invest in $1,250 worth of assets that are tied to housing prices (for a leverage ratio of 98%, or capital ratio of only 2%), Bank A will be more likely to make money on that investment if other banks are doing the same thing, thereby causing housing prices to ratchet up. That $1,250 housing asset may be worth $1,300 next year, and if so, Bank A now has $1,300 in assets and only $1,225 in liabilities. Its equity capital has gone up by 200% to $75, and its leverage ratio has fallen to 94%. This works until the bubble bursts.[97]

While operating with high leverage ratios is attractive in a rising market, it is deadly if market prices begin to fall, even if by only a tiny amount at first. Thousands of home mortgages in the U.S.

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investments don't work out, but if there is only a small amount of shareholders equity (or "capital" in banks), creditors will also experience losses when the investments don't work out. Thus, on average, higher leverage shifts more risk onto creditors and makes shareholders better off.

[96] Viral V. Acharya, Lesse H. Pedersen, Thomas Philippon, and Matthew Richardson note that banks and other financial institutions do not take into account the full cost of risks they take, especially due to leverage, because much of the costs of that risk are externalized to other financial institutions or creditors or to society at large. Viral V. Acharya, Lesse H. Pedersen, Thomas Philippon & Matthew Richardson, *Measuring Systemic Risk* 5 (Fed. Reserve Bank of Cleveland, Working Paper No. 10-02, 2010).

[97] As Citibank's executive Chuck Prince put it, "When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance." Michiyo Nakamoto & David Wighton, *Citigroup Chief Stays Bullish on Buy-outs*, FIN. TIMES, July 9, 2007.

were in trouble, for example, even before housing prices started declining. This was because numerous investors bought houses (or invested in housing related assets) with very little money down, counting on the idea that as house prices went up, the borrowers could refinance if they couldn't make the mortgage payments on the original loan. Such investors were likely to be in trouble even if housing prices simply stopped rising.

Once an asset bubble peaks in a highly leveraged economy, all of the machinery that was expanding leverage, expanding credit and encouraging additional spending on assets goes into reverse. Now Bank A will be one of the first to be in trouble if it was too highly leveraged. But when Bank A defaults, that will rapidly ripple out to other institutions.

In this way, even if all participants in a market economy are rational, and if leverage is not regulated and limited, the financial sector will still tend to employ too much leverage. Other things being equal, excessive leverage, in turn, is likely to promote boom and bust cycles in the real economy. Boom and bust cycles tend to be devastating, however, not just to investors who bought inflated assets at the peak, but also to millions of individuals who did nothing more than take jobs in the booming part of the economy. When the bust part of the cycle hits, individuals at the margins of the labor market tend to bear the brunt of the decline in economic activity. This includes minorities, those with low skills, new high school graduates and college graduates who were not employed before the crash and have very little experience and even older people who work in parts of the economy that depend heavily on surplus disposable income, such as tourism.

Meanwhile, individual bankers, traders, brokers and other financial intermediaries who helped to create the bubble may actually be better off in a rollercoaster economy and thus have significant incentives to try to impede reform, especially reform that would limit leverage. The reason is that compensation practices in the financial sector of the economy often allow certain financial sector employees to get paid enormous sums of money during good years, without having to pay back that money in bad years.

VI. Asset Bubbles Drive Excessive Compensation in the Financial Sector

The financial sector has grown substantially, measured as a percentage of total GDP in the U.S., from about 5% in 1980 to

around 7.5% in 2008.[98] And people who work in this sector have enjoyed much faster growth in compensation than the average person in other parts of the economy for the last three decades.[99] Compensation per employee in finance has gone from about $35,000 per year in 1980 (in inflation-adjusted 2009 dollars) to approximately $100,000 per year per employee (including secretaries and clerks) since 2002.[100] Here, I hypothesize that both of these trends are, at least in part, a product of the tendency of the financial sector to operate in ways that generate asset bubbles.

The compensation paid to people who work in the finance sector of the economy is part of the transaction costs associated with managing financial assets and channeling savings into productive investments.[101] Financial wealth has grown somewhat relative to total wealth in recent years, so it might at first not seem surprising that the amount of money paid out for managing that wealth has grown relative to GDP.[102] But consider that many of the components of total transactions costs—especially information costs and computational costs—have fallen dramatically in the last thirty years. Thus, one might expect that the cost of providing financial services to the economy, while having grown in absolute terms, might have declined over the last thirty years as a share of total income or total wealth. Indeed, this has happened to some degree in some parts of the financial sector. In the mutual fund industry, for example, as more funds eschew stock picking and timing and instead follow an index fund strategy, fees have declined from an average of 2.32% of assets under management for stock funds in 1980 to 1.13% in

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[98] *See infra* Fig. 9. Finance has grown relative to GDP in other countries as well. *See generally* Andrew Haldane, Simon Brennan & Vasileios Madouros, *What is the Contribution of the Financial Sector: Miracle or Mirage?*, *in* THE FUTURE OF FINANCE: THE LSE REPORT 87 (2010).

[99] *See infra* Fig. 11.

[100] *Id.*

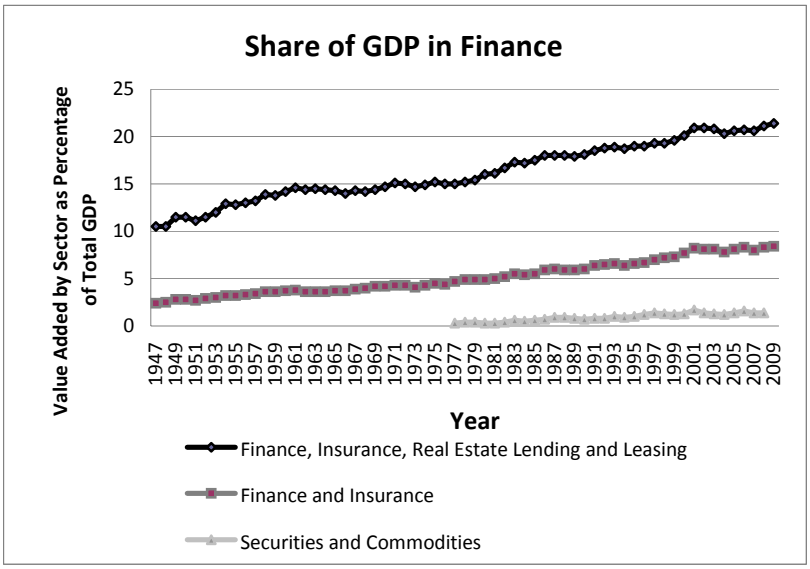
[101] Philippon, *supra* note 13, at 5-8.

[102] Financial assets as a share of total household net worth ranged from about 68% to 74% from 1946 through 1994, but climbed out of that range in the 1990s, and reached 78.8% in 2007, and 83.2% in 2009. The jump up in the ratio in the last few years is probably the result of the decline in housing values during the recession, even as government debt rose significantly. BD. OF GOVERNORS, FED. RESERVE SYS., STATISTICAL RELEASE Z.1: FLOW OF FUNDS ACCOUNTS OF THE UNITED STATES:2005-2009, *supra* note 38, at Table B.100 (Balance Sheet of Households, line 8 (Financial assets) divided by line 42 (Net worth)).

2005.[103] For bond funds, fees have declined from an average of 2.05% in 1980 to 0.90% of assets under management in 2005.[104] Despite declining as a share of assets, the total fees paid to mutual funds, however, grew from $1.3 billion in 1980 to $73.1 billion in 2005, because the value of assets under management has grown so much.[105]

Figure 9 shows that the "output" of the financial sector has grown from around 5% of GDP in 1980 to around 7.5% of measured GDP in 2008, although this appears to be a continuation of a trend that goes back at least to 1945.

Fig. 9. Share of GDP in Finance



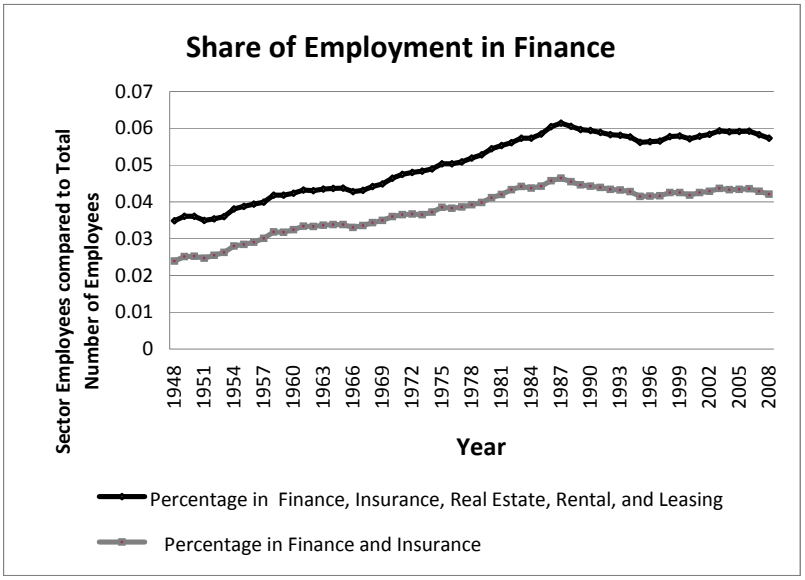
Source: Author's calculations from *Gross Domestic Product by Industry Accounts, Value Added by Industry as a Percentage of Gross Domestic Product*, U.S. Bureau of Economic Analysis, Sept. 30, 2010. More details on file with author.

In Figure 10, we see that the share of total employment in finance, after growing steadily from 1945 to 1985, has not continued to grow since the mid-1980s. In other words, the delivery of financial

[103] Kaplan & Rauh, *supra* note 13, at tbl.5b.
[104] *Id.*
[105] *Id.*

services requires roughly the same share of the workforce as it did in the mid-1980s.

Fig. 10. Share of Employment in Finance

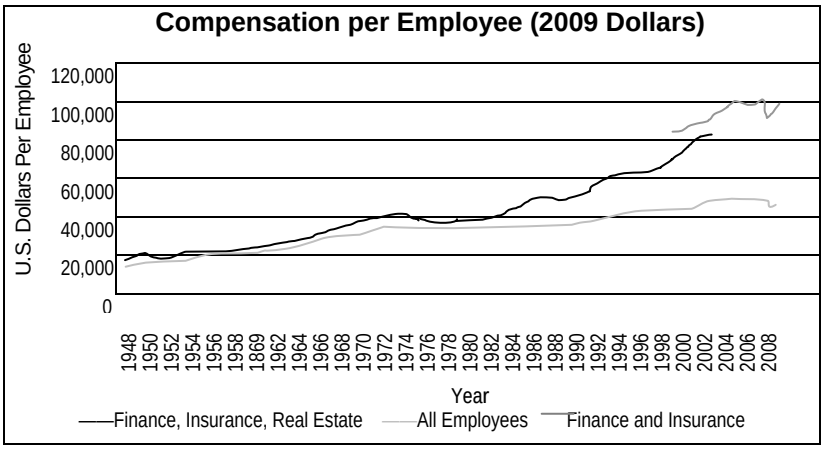


Source: Author's calculations from *1947-97 NACIS-Based GDP-by_Industry Data*, U.S. Bureau of Economic Analysis, *GDPbyInd_VA_NAICS_1998-2009*, U.S. Bureau of Economic Analysis. More details on file with author.

This suggests that compensation per employee in finance has grown substantially. Figure 11 shows that compensation in the broadly defined finance sector (including real estate) began growing faster than compensation in the economy as a whole around 1980. By the late 1980s, compensation in the subset of finance that includes finance and insurance only (not real estate) began growing even faster. By the early-2000s, compensation per employee (including clerks and secretaries) in the securities and commodities sector (which includes investment banking) had reached six-figure territory. Philippon estimates that in 2007, the bonuses alone on Wall Street exceeded $200,000 per employee.[106]

[106] Thomas Philippon, *Are Bankers Paid Too Much?*, VOX, Feb. 2, 2009, http://www.voxeu.org/index.php?q=node/2966. ("The bonuses of Wall Street reached more than $200,000 per employee in 2007.").

Fig. 11. Compensation per Employee—Finance and All Other



Source: Author's Calculations from *Table 6.2B. Compensation of Employees by Industry*, U.S. Bureau of Economic Analysis, Aug. 20, 2009, (covering years 1948-1987); *Table 6.2C. Compensation of Employees by Industry*, U.S. Bureau of Economic Analysis, Aug. 20, 2009, (covering years 1987-2000); *Table 6.2D. Compensation of Employees by Industry*, U.S. Bureau of Economic Analysis, Aug. 05, 2010, (covering years 1998-2009). BEA changed the way it defined various industries in 1998, so continuous data could not be constructed for employees in finance, insurance and real estate, or for employees in finance and insurance. More details on file with author.

The acceleration in the growth of incomes in the financial sector relative to the rest of the economy corresponds in timing to a dramatic widening of the income distribution in the U.S., which also began in the 1980s. Piketty and Saez have documented that across the economy, incomes have grown much faster at the upper reaches of the income distribution since the 1980s, and upper income earners have captured a growing share of total income in the U.S.[107] They show that at the end of World War II, the top 1% of income earners earned about 10 to 12% of all income, and this continued until 1952, when the share of the top 1% dropped below 10% and stayed at about 10% or less until 1988.[108] After that, the share of the top 1% began climbing steadily, reaching 23.5% in 2007, almost up to the

[107] Thomas Piketty & Emanuel Saez, *Income Inequality in the United States, 1913-1998*, 118 Q. J. ECON. 1, 7-14 (2003).
[108] *Id.* at 9-10.

previous high of 23.9% in 1928.[109] In 2008, the share of the top 1% fell a bit, but Saez shows that from 1993 through 2008, the top 1% of income earners captured 52% of all the income growth for the whole economy.[110] Within the top 1%, the distribution also widened, so that the top .01% captured a growing share of the income of the top 1%, also peaking in 2007.[111]

The correspondence between the increase in the share of GDP accounted for by finance, and the increase in the share of income captured by the top echelons of income earners, does not, of course, prove that the former explains the latter. Kaplan and Rauh, however, attempt to estimate the proportion of individuals in the highest income brackets in the U.S. that are employed in the finance sector.[112] They observe that it has become common in investment banks that many individual traders, partners and other executives are very highly paid.[113] Through a complex process, they estimate that about 10,000 top-tier managing directors at investment banks received enough pay in 2004 to place them in the top brackets of income earners in the U.S., and that, collectively, investment bankers alone may have accounted for as much as 6 to 11% of the top 0.01% of the income distribution in that year.[114] This measure does not include highly paid employees of other categories of financial firms, which would presumably add thousands of additional individuals from banks, hedge funds, mortgage brokers and other financial firms, who are paid enough to put them into the top income brackets.

Thomas Philippon and Ariell Reshef have conducted groundbreaking work that explains the high compensation levels of

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[109] Emmanuel Saez, *Striking it Richer: The Evolution of Top Incomes in the United States (Updated with 2008 Estimates)*, July 17, 2010, http://elsa.berkeley.edu/~saez/saez-UStopincomes-2008.pdf. Point estimates based on figure.

[110] *Id*. at tbl.1, fig.2.

[111] *Id.* at fig.3.

[112] Kaplan & Rauh, *supra* note 13, at tbl.8a.

[113] *Id.* Goldman Sachs is reported to have paid more than $1 million in bonuses to each of 953 employees in 2008, and set aside a large enough bonus pool in 2009 to pay up to $700,000 each to 31,700 employees. Graham Bowley, *Bonuses Put Goldman in Public Relations Bind*, N. Y. TIMES, Oct. 16, 2009, at B1.

[114] Kaplan & Rauh, *supra* note 13, at 17 ("Using our assumptions, we estimate that the 10,000 top-tier managing directors at investment banks generate enough AGI to explain at least 5.8% (Pareto) or 11.2% (exponential) of the top 0.01% of the AGI distribution.").

people who work in the financial sector.[115] They assembled data on wages, education and occupations from 1910 to 2005 and show that the financial sector of the U.S. economy employed people with substantially higher levels of education on average than in the rest of the economy from 1910 through 1930.[116] Then, average education levels in finance dropped to levels much closer to the economy-wide average in the early 1930s and stayed there until 1980.[117] After 1980, the average education level in finance once again rose past where it was relative to the rest of the economy prior to 1930, and it has continued to climb.[118] Since the early 2000s, financial firms have had almost twice the share of employees with more than a high school education than is found in the rest of the economy.[119] Philippon and Reshef show that like education levels, compensation in the financial sector relative to compensation in the rest of the economy has also exhibited a long U-shaped pattern, in which it was quite high in the period prior to 1930 (more than 1.5 times the level of the rest of the economy), dropped after 1930 to levels no more than about 10% higher than the rest of the economy, and then climbed back up after 1980 to as much as 1.7 times pay levels in the rest of the economy.[120]

Using regression analysis, Philippon and Reshef demonstrate convincingly that the higher education and skill level in the financial sector prior to 1930 and after 1980 correspond to periods when initial public offerings for new businesses were especially frequent.[121] They hypothesize that greater skill is needed to assess creditworthiness and to price credit instruments issued by new businesses than is needed to price the risk of other securities, such as government bonds or bonds issued by larger stable companies.[122] Thus, in periods when corporate finance activities dominated the financial markets, the financial sector has employed more highly educated people. Regression

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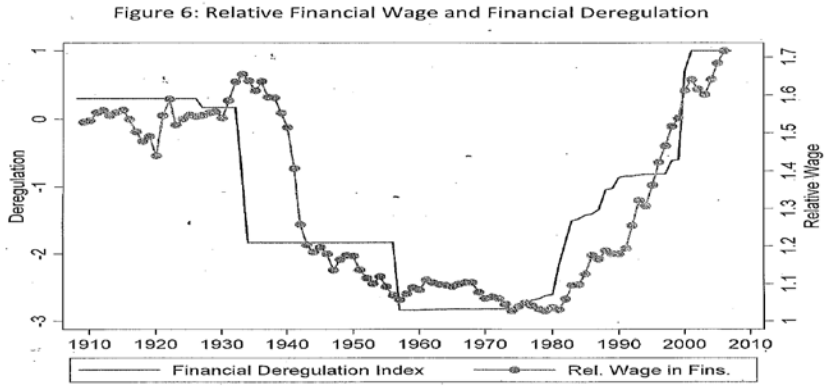
[115] Philippon & Reshef, *supra* note 13.
[116] *Id.* at 8.
[117] *Id.*
[118] *Id.*
[119] *Id.*
[120] *Id.*
[121] *Id.* at 16.
[122] *Id.*

analysis supports this hypothesis, but makes it clear that this does not explain the whole pattern.[123]

Phillipon and Reshef also hypothesize that the returns to education and skills in the financial sector are likely to be much higher in periods when finance is not highly regulated than in periods when it is, because there is less room for innovation in the latter periods.[124] The authors construct several indices of financial regulation and show that these indices are highly significant in predicting the relative education level and the relative wage level in finance.[125] One figure is especially telling. Figure 12 below is borrowed from Figure 6 in Philippon and Reshef.[126] This shows that when the authors' financial deregulation index drops in the early 1930s as a result of the imposition of an extensive regulatory structure for finance during the Great Depression, the relative wage paid in finance also drops within a few years, and when finance is deregulated in the years from 1980 to 2000, the relative wage climbs back up to new highs.

Fig. 12. The Relationship between Wages in Finance and Deregulation



Source: Philippon & Reshef, *supra* note 14, at Fig. 6.

[123] *Id.* at 15-17 (listing information technology, financial patents, credit risk, and deregulation as other variables responsible for higher education and skill level in the financial sector during those time periods).
[124] *Id.* at 17. (explaining deregulation as another possible reason for high levels of education).
[125] *Id.* (explaining the indices used).
[126] *Id.* at Fig. 6.

Philippon and Reshef conclude that education can explain most of the higher pay in finance prior to the 1980s, but since 1980, the pay for financiers has risen substantially beyond the level that can be explained by higher education.[127] The authors also show that the higher pay in finance cannot be explained by higher risks associated with working in finance, nor can it be explained by unobserved characteristics of the people who work in finance.[128] Thus, they ultimately conclude that economic "rents . . . account for 30% to 50% of the wage differentials observed since the late 1990s."[129]

The idea that financiers are capturing "rents" naturally leads to the question of where the rents come from in finance. Since finance is a transaction cost, for financiers to capture "rents" of such magnitude implies that there are considerable inefficiencies involved in the provision of financial services. One source of such rents could be economic power that providers of financial services have relative to their suppliers or customers, but presumably it would be difficult for financial institutions to sustain their market power over time if there were a large and growing number of firms in the market. Joel Houston and Kevin Stiroh report the number of firms in each of four sectors within finance (commercial banks, savings institutions, insurance firms and other financials) for the time periods 1975-1984, 1985-1994 and 1995-2005.[130] In each subsector, the number of firms grew significantly over time, with the total for the sector growing from 423 firms (on average) in 1975-1984 to 1,026 firms in 1995-2005.[131] Although the financial crisis resulted in some consolidation, there are still hundreds of banks and other financial institutions operating in the U.S., and even the largest banks face competition from international firms, as well as from institutions in the shadow banking system. So, it seems unlikely that the "rents" being captured by individuals employed in the financial sector are monopoly rents. Nonetheless, further work should perhaps be done to determine whether banks have been able to charge higher than competitive market prices for their services in recent decades.

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[127] *Id.* at 29 ("In both cases, excess wages in the financial sector appear only from the mid-1980s onward.").
[128] *Id.* (stating that "a large part of the excess wage in Figures 11 and 12 is due to rents.").
[129] *Id.* at 30.
[130] JOEL F. HOUSTON & KEVIN J. STIROH, FED. RESERVE BANK OF N.Y., THREE DECADES OF FINANCIAL SECTOR RISK Table 1 (2006).
[131] *Id.*

Do financial market firms perhaps control some scarce resource or intellectual capital? Large amounts of resources are undoubtedly expended by individuals and firms in the financial markets in attempts to gain an information advantage, computing advantage, or trading advantage,[132] but analysts repeatedly find that financial markets are efficient enough that investors are rarely able to "beat the market" more often than might be expected as the result of pure chance.[133] Moreover, Philippon and Reshef find very little evidence that either of two measures of technology, information technology ("IT") intensity (the share of IT and software in the capital stock of the financial sector), or financial patents, help explain relative wages in finance, though financial patents do appear to help explain relative levels of education among financial industry employees.[134]

So what could be the source of the rents that have made it possible to pay the people who work in the sector so much more than they could expect to earn with the same education and skills in some other sector? To answer these questions, it might be helpful to know how much value the financial sector provides to the economy as a whole. Unfortunately, the data on the contribution of the financial sector to GDP is not particularly helpful in answering this question. This is because in the financial sector, there is no independent measure of the created value. Moreover, there is no agreed-upon unit of output in the industry, such as the number of cars or trucks in the

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[132] For example, some "fast-moving computer-driven investment firms" are purchasing data from stock exchanges and using supercomputers to attempt to gain a trading advantage by calculating stock prices a fraction of a second before most other investors see the numbers. Scott Patterson, *Superfast Traders' New Edge*, WALL ST. J., June 4, 2010, at C1.

[133] *See* Michael C. Jensen, *The Performance of Mutual Funds in the Period 1945-1964*, 23 J. FIN. 389, 415 (1968) ("The evidence on mutual fund performance discussed above indicates not only that these 115 mutual funds were *on average* not able to predict security prices well enough to outperform a buy-the-market-and-hold policy, but also that there is very little evidence that any *individual* fund was able to do significantly better than that which we expected from mere random chance."); Burton G. Malkiel, *Returns from Investing in Equity Mutual Funds 1971 to 1991*, 2 J. FIN. 549, 570-71 (1995) ("Most investors would be considerably better off by purchasing a low expense index fund, than by trying to select an active fund manager who appears to possess a 'hot hand.'").

[134] Philippon & Reshef, *supra* note 13, at 15-16 (stating that neither IT intensity nor financial patents explain relative wages in finance).

automotive industry. Economists who compute the national accounts essentially measure the value added by finance as the difference between the interest and profits earned by financial firms, and the interest those firms pay their investors, plus revenues from specific fees charged for services.[135] In other words, the value of the output of finance is, by definition, assumed to be the same as the value that is captured by the employees and investors in the finance sector. This means that our measures of the value that is added by the services that finance provides can't be cleanly separated out from the economic return on the capital that the finance sector is using or managing. While the economic return on assets under management in finance includes some implicit provision for services that are not directly priced, it also includes some allowance for risk. But our measures of the value added to GDP by finance are not adjusted for risk. This means that the measured value added will be larger when the financial sector invests in a risky way so they earn a higher rate of return.[136]

The possibility that the higher returns in the financial sector in recent decades is little more than compensation for taking more risk is consistent with the theory I propose here, which is that financiers and shareholders of financial firms have earned "rents" because the apparent returns in the business have seemed to be higher than they are because of asset value inflation, and they have been further exaggerated by extraordinary levels of leverage.[137] One

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[135] JACK E. TRIPLETT & BARRY A. BOSWORTH, PRODUCTIVITY IN THE U.S. SERVICES SECTOR: NEW SOURCES OF ECONOMIC GROWTH 106 (2004). Part of what the financial sector earns, is, of course, paid out to the people who work in the sector in wages, and economists also generally assume that the people who work in finance contribute value equivalent to what they are paid. Philippon, *supra* note 13, at 5-6 (discussing many different economist's theories for why wages paid in the finance sector are so high).

[136] Susanto Basu & J. Christina Wang, *Risk Bearing, Implicit Financial Services, and Specialization in the Financial Industry* 14-16 (Fed. Reserve Bank of Boston, Public Policy Discussion Paper No. 06-3, 2005) (demonstrating that the riskier a bank's investments are, the higher rate of return it can expect); Haldane, Brennan & Madouros, *supra* note 97, at 91-94 (also demonstrating that the riskier a financial company's investments, the higher rate of return it will receive).

[137] Haldane, Brennan & Madouros find that "virtually all of the increase in ROE of major UK banks [since 2000] appears to have been the result of higher leverage. Banks' return on assets—a more precise measure of their productivity—was flat or even falling over this period." The higher returns

might expect that if returns are high due to taking higher risks, those returns should show much higher variance and should occasionally lead to substantial losses. Indeed, this has happened. Houston and Stiroh, for example, show that the variance of returns in the commercial banking sector increased by 74% from the 1975-1984 period to the 1985-1994 period.[138] After that, their measure of variance leveled off at the higher level in the period 1995-2005.[139] This latter period, as we showed in Figure 6 above, corresponds to when the banking sector was bringing its measured on-the-books leverage down, as more and more of the risks were moved off-balance sheet, into the shadow banking sector, where it is much harder to measure.

Financial firms, their investors and their employees have an incentive to take on greater risk via greater leverage because the incidence of returns and losses, from their perspective, is not symmetric. Firms get high fees, employees take home huge bonuses and shareholders get dividends in good years, when portfolio values rise, but they rarely have to give back any previously paid dividends or compensation when portfolio values decline. The downside risk falls on others, including creditors, and even, as we have seen, taxpayers.

Since 2007, trillions of dollars of nominal value have been lost on financial assets. To the extent that this is a correction to a pricing bubble in financial assets, this strongly suggests that the compensation paid in the financial sector was higher during the bubble years (and maybe throughout much of the last few decades) than it should have been in some sense—higher than it would otherwise have been if the assets being managed were not being artificially inflated in value by excess leverage.

VII. Why Reform Will Be Difficult

The financial sector in the U.S. not only accounts for a disproportionate share of GDP and of total compensation paid to employees, it also has vastly more influence on the rules of the game—the regulatory framework within which financial institutions

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to the financial sector in recent decades (as measured by contribution to GDP), they argue, is "likely to have been an act of risk illusion." Haldane, Brennan & Madouros, *supra* note 97, at 99-100.

[138] HOUSTON & STIROH, *supra* note 130, at Table 4.

[139] *Id.*

operate—than would be expected based on the number of people this sector employs or even its share of GDP. This is partly a result of the fact that the large paychecks that go to participants in the financial sector can be used to gain access to politicians and other policy makers. But in addition to influence that comes from money, finance has had outsized influence on policy for two other reasons. The first is the steady flow of people from the financial sector into high-level positions in Washington and the reverse flow of people from policy and regulatory positions in Washington into high-level positions on Wall Street. This "revolving door" helps ensure that policy makers are sympathetic to arranging the rules to protect and promote the health of Wall Street. The second is that, for most of the last three decades, finance has had great intellectual respectability, even cachet. Since at least the mid-1980s, the idea that unfettered financial markets will efficiently allocate society's resources and that a thriving financial sector generates stronger overall economic growth have dominated scholarly research in economics, finance and law. The dominance of this idea has put a high burden of proof on any challenger to show why particular regulations or limits on the actions, contracts, or securities created by financial market actors might be beneficial.

Much has been written about all three of these sources of financial sector power and influence, and I will not attempt to summarize all of it here.[140] But I will briefly summarize some of the more significant evidence that the finance sector has had substantial influence on setting and implementing the policies that made the financial crisis possible and will likely continue to impede any attempt at reform.

A. The Money Channel

As described in the previous section, the financial sector of the U.S. has been capturing a growing share of the total GDP and total compensation paid to employees. This flow of money into finance has helped to sustain a massive flow of money into politics. In terms of the sheer dollar volume of money going to political contests, lobbying and influence in Washington, no other sector of the economy comes close to finance. The Center for Responsive

[140] For a fascinating, if somewhat terrifying, study of the ties that have bound Washington and Wall Street over the past few decades, see JOHNSON & KWAK, *supra* note 5, at 88-119.

Politics, a non-profit, non-ideological organization which collects and tracks data on the role of money in politics and makes the data available to the public on its website, notes that "[t]he financial sector is far and away the largest source of campaign contributions to federal candidates and parties, with insurance companies, securities and investment firms, real estate interests and commercial banks providing the bulk of that money."[141]

In the 2008 election cycle, for example, the finance, insurance and real estate sector accounted for 19.7% of the $2.42 billion donated to Congressional and Presidential campaigns.[142] In spite of the fact that the whole sector was in financial turmoil in 2008, this was actually up slightly from the 20-year average of 19.35% of donations to Congressional and Presidential campaigns.[143] The sector spends enormous amounts on lobbying as well, accounting for almost 14% of all dollars spent on lobbying in the 2008 election cycle.[144] So far, in 2010, the finance sector has spent 13.3% of all lobbying dollars.[145] Moreover the sector accounts for about 19% of all lobbyists.[146]

The flow of money into politics from finance has been bipartisan: "The sector contributes generous sums to both parties, with Republicans traditionally collecting more than Democrats,"

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[141] *Finance/Industry/Real Estate*, OPENSECRETS.ORG, http://www.opensecrets.org/industries/indus.php?ind=F (last visited Dec. 16, 2010).

[142] Author's calculation based on data from *Totals by Sector*, OPENSECRETS.ORG, http://www.opensecrets.org/bigpicture/sectors.php?cycle=2008&Bkdn=DemRep&Sortby=Rank (last visited Dec. 16, 2010). CRP tracks only donations by PACs and by individuals who contribute $200 or more because these donations must be publicly reported. The data on the financial sector for this calculation and the ones that follow include the health insurance industry as part of the insurance subset of the financial sector. *Insurance*, OPENSECRETS.ORG, http://www.opensecrets.org/industries/indus.php?cycle=2010&ind=F09 (last visited Dec. 16, 2010).

[143] Author's calculation based on data from *Totals by Sector*, OPENSECRETS.ORG, http://www.opensecrets.org/bigpicture/sectors.php?cycle=2008&Bkdn=DemRep&Sortby=Rank (last visited Dec. 16, 2010).

[144] Author's calculations based on data from *Ranked Sectors 2008*, OPENSECRETS.ORG, http://www.opensecrets.org/lobby/top.php?showYear=2008&indexType=c (last visited Dec. 16, 2010).

[145] Author's calculations based on data from *Ranked Sectors 2010*, OPENSECRETS.ORG, http://www.opensecrets.org/lobby/top.php?showYear=2010&indexType=c (last visited Dec. 16, 2010).

[146] *Id.*

according to Center for Responsive Politics.[147] "Yet in the past two election cycles, bankers have suddenly shifted their cash toward Democrats. The sector gave at least 55 percent of their contributions to the GOP from 1996 to 2004, but actually gave a slight majority of their donations to Democrats in the 2008 cycle."[148]

B. The People Channel

At least as important to influencing policy as money and campaign contributions have been are the extraordinary flow of people from positions in the White House, Congress and the regulatory agencies into highly paid jobs in Wall Street firms and from Wall Street firms into positions of influence in Washington. Top executives from Goldman Sachs alone have served as Cabinet members and senior advisors to the last three Presidents and have been enormously influential in the deregulation of much of the financial sector since the late 1980s. At the apex of power, Robert Rubin, previously a co-chairman of the board at Goldman, was President Clinton's director of the National Economic Council ("NEC") and then Secretary of Treasury in Clinton's second term; Stephen Friedman, another former Goldman co-chair, was director of NEC for George W. Bush and later chairman of the New York Federal Reserve Bank; Henry Paulson, chair of Goldman from 1999 to 2006, was Bush's Secretary of Treasury.[149]

Just as senior executives from the financial sector have moved frequently into top policy jobs in Washington, former federal employees have gone to work for Wall Street. A new report from the Center for Responsive Politics[150] finds that the financial sector has

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[147] *Finance/Industry/Real Estate*, OPENSECRETS.ORG, http://www.opensecrets.org/industries/indus.php?ind=F (last visited Dec. 16, 2010).

[148] *Id.*

[149] Johnson and Kwak also identify Gary Gensler and Robert Steel, both undersecretaries of Treasury under Clinton and Bush; Sen. Jon Corzine, who became a member of the Senate Banking Committee; William Dudley, president of the New York Fed; Joshua Bolten, director of the Office of Management and Budget and chief of staff to President Bush; and Neel Kashkari, head of the Troubled Asset Relief Program (TARP), all as Goldman Sachs alumni. See JOHNSON & KWAK, *supra* note 5, at 94.

[150] *See Banking on Connections: Financial Services Sector Has Dispatched Nearly 1500 "Revolving Door" Lobbyists Since 2009*, OPENSECRETS.ORG, June 3, 2010, http://www.opensecrets.org/news/FinancialRevolvingDoors pdf.

hired seventy-three former members of Congress and 1,447 other former federal employees to lobby on their behalf, either as full-time employees of one of the large banks or as consultants, since the beginning of 2009.[151] "These people are influential because they have personal relationships with current members [of Congress] and staff," according to David Arkush, director of Public Citizen's Congress Watch division.[152]

The flow of people goes the other direction too. The same Center for Responsive Politics study identifies eighty-two staff members for Senators and House members serving on the Senate Banking Committee or House Financial Services Committees in 2010 who previously worked as lobbyists for the finance industry.[153]

Another way that the "people channel" has helped the finance sector become powerful has been the steady diversion of our top science, math and engineering graduates into finance and away from the fields for which they were trained. Claudia Goldin and Lawrence Katz recently found that the share of Harvard graduates that go into the financial sector has increased dramatically from a few decades ago:

> Among those who graduated around 1970, 22 percent of the men were in finance or management 15 years later. Among those who graduated around 1990, the figure was 38 percent. The proportion of male graduates working in finance alone increased from 5 percent to 15 percent during the same period. And a *Harvard Crimson* survey [in 2007] found that among graduating seniors heading straight to work . . . 58 percent of the men were headed for finance or consulting, and more than 20 percent of all men for investment banks."[154]

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[151] *See id.* at 3 (discussing the industry's use of former federal employees and former congressmen).

[152] Press Release, OpenSecrets.org, Report: Revolving Door Spins Quickly between Congress, Wall Street (June 3, 2010), http://www.opensecrets.org/news/2010/06/report-revolving-door-spins-quickly.html.

[153] OPENSECRETS.ORG, *supra* note 150, at 9-10 ("82 [financial sector lobbyists] worked for members who currently serve on the committees").

[154] Elizabeth Gudrais, *Flocking to Finance*, 2008 HARV. MAG., 18, 18-19.

Prof. Vivek Wadhwa at Duke University similarly told Congress recently that, "30-40% Duke Masters of Engineering Management students . . . chose to become investment bankers or management consultants rather than engineers."[155]

This influx of talent is not only a response to the fact that so much money can be made in finance, but it also reflects the fact that, for the last three decades, finance has been an exciting place to be intellectually.

C. The Intellectual Channel

Despite the money, the talent and the connections, the financial sector might not have become so influential in policy circles if the ideas that the financial sector was promoting had been regarded as boring or intellectually disrespectable. But not only were these ideas respectable, the important ideas in finance were elegant, seductive and exciting. The most important of these ideas, and the one that formed the basis of all the others, was what came to be called the efficient capital market hypothesis ("ECMH"), or sometimes just the efficient market hypothesis. The ECMH asserts that, when assets are freely traded in deep and liquid markets, the price at which the assets trade will, at any point in time, take into account all of the information available to the market about those assets.[156] One important implication of the ECMH is that changes in the price of securities traded on deep markets should be random and should only happen if new information comes into the market. If new information is genuinely "news," investors should not be able to predict which direction securities prices might go next. Another

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[155] Vivek Wadhwa, Pratt Sch. of Eng'g, Duke Univ., Testimony to the U.S. House of Representatives Committee on Education and the Workforce (2006), *available at* http://www.cggc.duke.edu/pdfs/051606_Testimony _of _Vivek_Wadhwa.pdf.

[156] The "strong form" version of this hypothesis says the price incorporates and reflects all information about the asset, whether public or private; the "semi-strong form" says price reflects all public information; and the "weak form" says the current price reflects all past price and trading volume information. *See*, *e.g.,* FRANKLIN ALLEN, RICHARD A. BREALEY & STEWART C. MYERS, PRINCIPLES OF CORPORATE FINANCE 363 (9th ed. 2008) ("[I]n an efficient market it is not possible to find expected returns greater (or less) than the risk-adjusted opportunity cost of capital. This implies that every security trades at its fundamental value . . . .").

important implication is that market-determined prices could be trusted to be the "right" prices.

Although a few finance theorists and practitioners had observed prior to the 1960s that markets for financial securities seemed to behave as if changes in the prices of securities were random and as if investors could not predict which direction prices would go next, the theory was not developed formally until Eugene Fama did so in his Ph.D. dissertation, published in 1965. By 1970, the idea was becoming accepted among theorists and was being used to develop other securities pricing models and, importantly, incorporated into finance theory taught to management and business students.

The ECMH can be neither directly proven, nor disproven, because there is no independent source of pricing information that can be regarded as the "true" price against which one might test the hypothesis that the price that comes out of a free exchange in a liquid market is identical to that "true" price. But there is substantial evidence that securities price changes are not predictable. And it turns out that if one simply assumes that the hypothesis is true, then one can put forth an almost infinite array of secondary hypotheses about how various assets should be priced relative to other assets. The simplest example is that any security should trade at the same price at a given point in time, whether it trades in Chicago, or New York, or London. If shares of Microsoft stock traded at a higher price in London than in New York, there would be an opportunity for a trader to buy Microsoft shares in New York and sell them at the same time in London and (except for the transactions costs) make an instant profit without taking any risk or tying up any capital. This kind of transaction is called "arbitrage."

A slightly more complex example involves two very similar securities: (1) a newly issued 24 month $1,000 face value U.S. Treasury note that pays 4% interest, with interest payments made at the end of each calendar quarter; and (2) an existing $1,000 face value Treasury note that pays 4% interest at the end of each quarter and that has 24 months remaining before the principal is repaid. These two securities should have exactly the same price because they have exactly the same cash flows, even if the second security was originally a 10-year note that now only has 24 months left. And both of these should be priced at almost exactly the same price as a package of two assets: an AAA-rated zero coupon bond that will pay $1,000 in 24 months (but nothing in between), plus an AAA-rated

annuity that will make eight payments of $10 each at the end of each quarter from now until 24 months from now.

Once the idea is accepted that securities with similar cash flow characteristics should trade for about the same price, it becomes possible to create mathematically precise asset pricing models for pricing all kinds of contracts and securities that range from simple to extremely complex. This is because any security can be thought of as a package of simpler securities, each of which might be easier to price. These models can be constructed on and run by computers to give asset traders second-by-second information about what any given asset should sell for (relative to other assets), so that the trader (or the computer) can then look for anomalies or opportunities for arbitrage. The computer models used to price complex securities use huge amounts of information. But as the cost of computing and information processing came down dramatically in the 1980s and 1990s, financial firms began deploying armies of highly-skilled economists, mathematicians, computer programmers and even engineers to build and operate asset pricing and trading models. Still more armies of mathematically-trained finance theorists as well as other scientists and engineers worked on developing new securities, including various kinds of derivatives, that were designed to have various risk and cash flow properties that the firms thought would be attractive to investors.

Although the ECMH was developed to apply to securities markets, the idea was taken much further to imply that free and active markets always do a good job of pricing assets of all kinds and that free markets, in general, always do a good job of allocating resources to their most productive use. This highly seductive belief in the benefits of free markets, then, has provided intellectual respectability since at least 1980 to an entire body of policy choices designed to free up financial markets from regulation by any arm of government. In the 1980s, Congress chose not to regulate the so-called "market for corporate control," which was the appealing name given by free market advocates to the wave of hostile takeovers and leveraged buyouts of corporations in that decade. In the 1990s, financial firms advocated for, and got permission to, merge across state lines and across different subsectors (i.e., banking, insurance, brokerage and funds management). This steady elimination of the boundaries between different categories of financial institutions culminated in the passage of Gramm-Leach-Bliley Act of 1999, which had the effect of repealing the Glass-Steagall Act. The Glass-Steagall Act had been in place since the 1930s to separate retail

banking from investment banking so that banks that were accepting deposits from individual investors could be insured, regulated and protected from bank runs. Also in the 1990s, policy-makers not only failed to establish a regulatory structure for the new types of derivative securities that were being invented by Wall Street, but they actually put up a legal fence around many such securities, protecting them from regulation.[157]

After 2000, a whole raft of other rules were changed and tweaked that had the effect of eliminating most restrictions on the kinds of securities and contracts that financial firms could offer to investors or to borrowers. The cumulative effect of this increasingly relaxed regulatory posture toward the financial sector was to reduce or remove barriers to the use of increasing amounts of leverage. In the Appendix, I identify a series of regulatory changes that have made it possible for banks and other financial firms to take on increasing amounts of leverage and for a shadow banking system to emerge with virtually no limits to the amount of leverage and few safeguards to prevent the financial sector from stimulating asset bubbles, which appear to justify extraordinary levels of compensation.

VIII. Approaches to Reform

I have argued in this article that the single most important reform that needs to be made in the financial sector to reduce the likelihood of repeated bubbles and crashes in the financial markets is a reduction in the amount of leverage that financial firms use to finance their investment activities. In the months leading up to the financial market crash, numerous U.S. financial institutions were rumored to be operating with leverage ratios as much as 97% to 98%—implying ratios of assets to capital of as much as 30 to 1, or even 50 to 1.[158] Financial institutions with so much debt on their

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[157] *See generally* The Commodity Futures Modernization Act of 2000, Pub. L. No. 106-554, 114 Stat. 2763 (2000).

[158] For example, Citigroup was estimated to have a ratio of "tangible common equity" to tangible assets of just over 2% in the first quarter of 2008, or a leverage ratio of almost 98%, while Bank of America's leverage ratio was almost 97%. Rolfe Winkler, *Bank Buffers Increase, Still Not High Enough*, REUTERS, Feb. 11, 2010, http://blogs.reuters.com/rolfe-winkler/2010/02/11/bank-capital-buffers-increase-still-not-high-enough/ (graphing capital buffers). Tangible common equity is a conservative measure of bank capital.

balance sheets had almost no cushion to absorb any decline in the value of their assets when housing prices and mortgage-related assets began to get into trouble in 2007. Small declines in asset values in 2007 and 2008 initially caused leverage ratios to climb even higher, as the value of the institution's overall assets decreased. As institutions panicked, they sold assets to raise more capital, further driving down asset values.

Under substantial pressure from bank regulators in the fall of 2008 and throughout 2009, large U.S. banks brought their capital ratios up to around 6% (implying a leverage ratio of 94%) by the end of 2009.[159] And most international banks have similarly improved their capital positions for the time being. But while there is fairly widespread agreement among economists, policy analysts and regulators that capital ratios ought to be higher in the future,[160] it is less clear whether regulators will be able to make this happen.

To understand the problem, note first that bank regulators have probably had the authority to compel U.S. banks to hold more

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Elliott, *supra* note 58, at 4 ([Tangible common equity] "is an even more conservative definition of capital than common equity."). See also references in note 70. Note that, technically, the banking sector had fairly high ratios of regulatory capital to assets in 2007—perhaps as high as 10%. *See* Bloomberg News, *Greenspan Sees Need to Raise Capital Levels*, WASH. POST, Mar. 19, 2010, http://www.washingtonpost.com/wp-dyn/content/article/2010/03/18/AR2010031801809.html?sid=ST2010031805667 (stating that banks were at 10 percent in mid 2007). But this did not take into account all of the effective leverage in the shadow banking system that had been hidden by the use of special investment vehicles for securitizing mortgages and other assets, nor all the contingent liability in the derivative positions of large financial institutions.

[159] *See id.* (showing that the four major banks had close to a 6% capital buffer in 2009).

[160] "The most pressing reform that needs fixing in the aftermath of the crisis, in my judgment, is the level of regulatory risk-adjusted capital," says Former Federal Reserve Chairman Alan Greenspan. Greenspan argues that required capital ratios should be increased to as much as 14% of assets. Bloomberg News, *supra* note 158. Brookings Institution scholar Douglas Elliott asserts that "[t]here is strong consensus among policymakers that there need to be higher minimum capital requirements for banks . . . ." Douglas Elliott, Brookings Inst., *A Further Exploration of Bank Capital Requirements: Effects of Competition from Other Financial Sectors and Effects of Size of Bank or Borrower and of Loan Type* 1 (2010), http://www.brookings.edu/~/media/Files/rc/papers/2010/0129_capital_elliott/0129_capital_requirements_elliott.pdf.

capital and reduce their leverage for decades. Elliott observes that the framework governing bank capital requirements today was established by the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991,[161] which specifies certain minimum ratios, but "leaves regulators the ability to establish tougher requirements and to take account of non-numerical factors such as an assessment of whether a bank is being operated in a safe and sound manner."[162] Moreover, other bank regulators, such as the Federal Reserve Board and the Office of the Comptroller of the Currency ("OCC"), could also impose their own capital standards, although in practice regulators have coordinated their efforts and applied common standards.[163] Yet, while regulators seem to have had considerable authority to regulate leverage, for the most part, they did not do so.

One reason for this result is that, since the late 1980s, regulators in the U.S. have also tried to coordinate their capital standard requirements with bank regulators in the other leading industrial countries in an attempt to minimize the attractiveness of arbitrage across jurisdictions. These efforts led to the Basel Agreements, discussed in Section III.B above. Although the Basel Agreements have never had the force of law, regulators have used them as a guideline. Under Basel I, regulators began applying a two-tiered approach to measuring capital in banks (the numerator in the capital ratio requirement) and a risk-weighted approach to measuring the assets (the denominator in the capital ratio requirement). As capital ratio requirements became more complicated, banks increasingly figured out ways to game the system by investing in assets that had high returns but were judged by rating agencies as having low risk, such as mortgage-backed securities. Regulators were largely complicit in this game,[164] although technically measured

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[161] *See generally* The Federal Deposit Insurance Corporation Improvement Act of 1991, 12 U.S.C. §§ 1811-1835 (1991).

[162] Elliott, *supra* note 58, at 8.

[163] *Id.* at 8 ("In practice, they have coordinated their minimum capital requirements in order to avoid encouraging regulatory arbitrage, a condition where business flows to entities regulated under the loosest standards.").

[164] The relative simplicity of the Basel I standards "permits changes in the form of an asset or transaction to result in a different capital requirement being assigned to what is essentially the same risk," according to Tarullo. TARULLO, *supra* note 59, at 79. *See also* Elliott, *supra* note 58, at 9-11 (discussing problems regulating under this system).

regulatory capital rose as a share of risk-weighted assets at U.S. banks from 1988, when Basel I was adopted, to 1996, when the Basel Committee began working to revise the agreement.[165]

Under Basel II, adopted in 2004, the formulas for measuring regulatory capital and risk-weighted assets became even more complicated. And, even more troubling, large banks were permitted to use their own internal models to assign risk weights to bank assets.[166] The net effect was widely believed to have resulted in a loosening of capital requirements in practice.[167] Basel II was never fully implemented prior to the financial market crisis, and since the financial crisis, the leading countries that are members of the Basel Committee have acknowledged that the Basel II standards had the effect of reducing capital requirements (increasing permitted leverage).[168] These countries have been working on revising them

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[165] TARULLO, *supra* note 59, at 67 ("There is little question but that the risk-adjusted capital ratios of banks in committee member countries rose following the adoption of Basel I.").

[166] *See* Erik F. Gerding, *Code, Crash, and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127, 127 (2009) ("Bank regulators should scrap those provisions of Basel II that allow certain banks to set their own capital requirements according to their internal risk models.").

[167] Senator Ted Kaufman, Democrat of Delaware, criticized the reliance on internal bank models in Basel II in a letter to President Obama as the Dodd-Frank Act was being negotiated, observing that "[b]y outsourcing their regulatory responsibilities to the banks that they were supposed to regulate, bank regulators were making an implicit admission that the size and complexity of the megabanks had exceeded their comprehension." He further criticized the Federal Reserve for, in his view, failing to enforce a leverage requirement. "By trying to tie capital requirements to so-called 'risk-based' measurements," he said, "the Federal Reserve—the main driver of the Basel process—apparently hoped to eliminate the basic leverage requirement. In fact, former Fed Governor Susan Bies told banks that 'the leverage ratio down the road has got to disappear.'" Letter from Edward E. Kaufman, Senator, U.S., to Barack Obama, President, U.S., Banking on Basel. . . Again (June 16, 2010), *available at* http://kaufman.senate.gov/imo/media/doc/6-16-10%20Basel%20cap%20standards%20speech4.pdf.

[168] *See*, *e.g.,* Alan S. Blinder, *Two Cheers for the New Bank Capital Standards*, WALL ST. J., Sept. 30, 2010, http://online.wsj.com/article/SB10001424052748704523604575511813933977160.html ("Basel II actually reduced capital requirements relative to Basel I. Even before the financial wreckage of 2007-2009, that looked like a mistake. After the crisis, it looked absurd.").

again to produce Basel III.[169] This is important because the massive financial reform bill passed by Congress over the summer of 2010, the Dodd-Frank Act,[170] does not directly deal with the leverage problem by establishing new, hard limits on leverage for banks or other financial institutions. The statute's only reference to any specific leverage ratio is that it requires the Federal Reserve to impose a maximum leverage ratio of up to 15 to 1 (93.3% debt to total assets, equivalent to a capital ratio of about 6.7%) for banks that are determined to be a "grave threat to the financial stability of the United States."[171] Beyond that, the Dodd-Frank Act does not get into specifics about regulating leverage, leaving it to regulators to work out the details; the Fed and the FDIC have indicated that they will take their cues from the work of the Basel Committee.[172]

However, the Dodd-Frank Act might yet lead to better regulation of leverage in the financial sector as a whole, including in the shadow banking sector, because it provides that if any firm or institution (not just banks) is designated by the new Financial Stability Oversight Council ("Oversight Council") to be a "grave threat," that institution will subsequently be regulated by the Fed and subject to the same sorts of stress tests and "15-to-1" leverage limits that are applied to banks that are so designated.[173] In making any such determination, "the extent of leverage" of the firm is one of eleven factors that are to be considered.[174] Importantly, however, the statute provides that, for purposes of meeting minimum capital

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[169] The Basel Committee reached agreement on a new set of standards on Sept.13, 2010, but this draft must be accepted by the leading economic countries that are parties to the Basel process for the new standards to take effect. Moreover, the new standards don't necessarily apply to the shadow banking sector.

[170] *See generally* Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No 111-203, 124 Stat. 1376 (2010).

[171] *Id.* § 165(j)(1).

[172] Sen. Kaufman was quoted after the passage of the Dodd-Frank Act to the effect that "[t]he financial reform bill includes only a promise of higher capital requirements for U.S. banks, which we were told were going to be negotiated on an international level." Yalman Onaran & Alison Vekshin, *Dodd, Frank Plan to Hold Hearings on Basel Capital Regulations*, WASH. POST, July 29, 2010, http://www.washingtonpost.com/wp-dyn/content/article/2010/07/28/AR2010072805776.html.

[173] Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No 111-203, § 113 Stat. 1398-1402 (2010).

[174] *Id.*

requirements that are imposed on large banks and systemically important nonbank institutions, the "computation of capital . . . shall take into account any off-balance-sheet activities of the company."[175] This provision has the potential to help bring all of the relevant assets and liabilities into the light of day. And, in theory, if the Oversight Council requires substantial players in the money markets to expand their disclosure to include off-balance sheet activities, better disclosure might also help the market to better police itself. But, here again, the details are largely left to regulators to work out in the months and years ahead.[176]

All of this raises the stakes for the work underway by Basel Committee. In late 2009 and early 2010, the Basel Committee moved to revise requirements under Basel III to impose much stricter capital requirements.[177] In response, a number of prominent U.S. banking

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[175] *Id.* § 165(k).

[176] Ezra Klein, *Why You Should Care About Basel III*, WASH. POST, July 27, 2010, http://voices.washingtonpost.com/ezra-klein/2010/07/why_you_should_care_about_base.html ("The Dodd-Frank bill . . . leaves many important things to be decided by the regulators. Of those, the most important is the level of capital that banks have to hold. . . . The Basel III process is a way of getting countries around the world to agree on how much capital banks will carry.").

[177] *See Banks Face Tighter Capital Standards Under Basel*, REUTERS, Dec. 17, 2009, http://www.reuters.com/article/idUSTRE5BF1ET20091217 ("The new rules proposed by the Basel Committee on Banking Supervision will introduce stricter limits on what counts as top-level assets and on risk exposure from trading in derivatives and securities . . . The announcement contained little detail on the size of a planned global leverage ratio which would limit banks' ability to lend but the committee said the new standards would probably take effect by the end of 2012. It said there would be a grace period for transition."). More recently, Treasury Secretary Timothy Geithner and former Federal Reserve Board Chairman Alan Greenspan, for example, appeared together on PBS show Nightly Business Report in May, 2010, emphasizing the importance of increased capital requirements. Geithner at one point said "[t]he only way I am aware of to design a more stable system is to use capital requirements to set and enforce constraints in leverage on institutions that could pose catastrophic risks to the financial system." About which Darren Gersh, Nightly Business Report Correspondent, observed "[r]egulators at the Federal Reserve and around the world are working on new standards that are expected to require banks to raise hundreds of billions of dollars of new capital." And Greenspan added, "[i]f capital is large enough, all the losses accrue to them and not to the debt holders and definitely do not default and therefore you don't have serial

industry and regulatory leaders made public statements to the effect that they believed Basel III would raise capital requirements substantially, complaining that this would compel them to reduce lending, which could slow the recovery. The banking industry responded by putting together studies that purported to show that the tighter requirements would slow down economic recovery and complained that banks would need to raise $700 billion in common equity between now and 2015 to meet the higher standards.[178] Independent estimates of the amount of new capital banks would need to raise were not so high. By late July, when the proposed new "capital and liquidity reform package" was released,[179] it appeared that the toughest new standards had been watered down: The minimum required level of capital to total assets was reduced to 3% instead of 4%;[180] the definition of capital, which had been strictly limited in the earlier drafts of the proposal, had been expanded to include a number of categories of assets that might not prove liquid in a crisis;[181] the expected need to raise new capital was reduced;[182]

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contagion." *Nightly Business Report: Capital Standards & Financial Regulatory Reform* (PBS television broadcast May 17, 2010) transcript *available at* http://www.pbs.org/nbr/site/onair/transcripts/capital_standards_and_financial_regulatory_reform_100517/.

[178] Chris Bryant & Brooke Masters, *Bankers Fear Effect of Basel Rules*, FIN. TIMES, June 10, 2010, http://www.ft.com/cms/s/0/92a3e422-747c-11df-b3f1-00144feabdc0.html ("The IIF estimates that banks will need to raise $700bn of common equity and issue $5,400bn of new long-term wholesale debt over the period 2010-15 to meet the new requirements."). *See also*, The Banks Battle Back, THE ECONOMIST, May 27, 2010, *available at* http://www.economist.com/node/16231434 ("That hasn't stopped the banks from fighting their quarter.").

[179] Press Release, Basel Committee on Banking and Supervision, The Group of Governors and Heads of Supervision Reach Broad Agreement on Basel Committee Capital and Liquidity Reform Package (July 26, 2010), *available at* http://www.bis.org/press/p100726.htm.

[180] Eric Dash, Matthew Saltmarsh & Nelson D. Schwartz, *Basel Group Agrees to New Global Rules for Banks*, N.Y. TIMES, July 27, 2010, http://www.nytimes.com/2010/07/28/business/global/28bank.html (discussing the plan's 3% leverage ratio).

[181] *See id.* ("The standards announced Monday are less onerous than previous proposals and give banks more leeway to define what counts as high-quality, or Tier 1, capital."); Floyd Norris, *In Basel, Eternal Work in Progress*, N.Y. TIMES, July 30, 2010, at B1 ("In December, none of those assets were to be counted in capital. Now all can be, albeit to a limited extent.").

and the phase-in period was delayed from 2014 to 2018.[183] The Basel Committee voted in mid-September to approve standards that are actually substantially tougher than expected, calling for a minimum level of common equity in banks of 4.5% (up from only 2% under Basel II) to be phased in over eight years. By itself, this does not sound very impressive, but on top of this, the proposal calls for a minimum level of "total capital" (which includes some asset categories in addition to equity capital) of 8%, plus a "capital conservation buffer" of another 2.5%, for total minimum capital plus conservation buffer in excess of 10% of total assets.[184]

Details of the new standards are being debated and negotiated in the fall of 2010 and G-20 (Group of 20 Finance Ministers and Central Bank Governors) members endorsed the framework for the new standards at the G-20 summit in Seoul, South Korea, in November 2010. The devil will be in the details and it will still be up to regulators to implement the new standards.[185] Moreover, these standards will not apply to non-bank shadow banking institutions, unless those institutions are designated as systemically risky by the Oversight Counsel. So substantial political will is still required for regulators to further restrict the financial sector's ability to expand credit in dangerous ways.

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[182] Norma Cohen, Brooke Masters & Megan Murphy, *US Banks Receive Basel III Boost*, FIN.TIMES, Aug. 18, 2010, http://www.ft.com/cms/s/0/ 0d5 4e652-ab01-11df-9e6b-00144feabdc0.html ("The analysis by BarCap's debt capital markets group estimates that the 35 largest US banks will have to come up with half as much new capital as had been expected . . . .").

[183] Joe Ortiz, *Wishy-Washy Capital Rules Follow the Cozy Stress Tests*, WALL ST. J., July 27, 2010, http://blogs.wsj.com/source/2010/07/27/wishy-washy-capital-rules-follow-the-cozy-stress-tests/(examining the delay).

[184] Press release, *Group of Governors and Heads of Supervision Announces Higher Global Minimum Capital Standards*, Bank for International Settlements, Basel Committee on Banking Supervision, (Sept. 12, 2010).

[185] On Dec. 16, 2010, the Basel Committee released the Basel III rules text. Over the long run, the rules should require substantial increases in capital ratios at many banks, as well as improvements in measures of leverage and liquidity. But the new standards are to be implemented gradually (over eight years), and "calibrated" over time to "assess whether its proposed design and calibration is appropriate over a full credit cycle and for different types of business models." Basel III rules text and results of the quantitative impact study issued by the Basel Committee, Bank of International Settlements Press Release, Dec. 16, 2010, available at http:www.bis.org/ press/p.101216.htm.

IX. Conclusions

While much of the policy discussion about financial market reform in the wake of the most severe financial crisis since the Great Depression has focused on protecting consumers and preventing future bailouts of financial institutions, the most important reform that needs to be made is to develop, institute and enforce limits on the ability of financial market firms to create too much credit and operate with too much leverage. Credit used safely and prudently helps businesses and individuals invest more than they could if they were limited to using only their own savings, so it is extremely important to a healthy economy that credit be available. But relying too much on credit makes individuals and businesses vulnerable to any interruption in income that they are counting on to service the loans they have taken out.

More importantly for our purposes here, credit provides an alternative to money and acts like money in stimulating the economy. When financial institutions that provide credit to the real economy borrow too much, they become overleveraged, which can lead to dangerous asset bubbles and make the financial markets unstable. Worse, excessive leverage in the financial sector can set the stage for sudden and catastrophic contractions when multiple financial institutions all try to deleverage quickly and at the same time. Although it is in society's interest to restrict the extent to which financial institutions can borrow to avoid such situations, it is not necessarily in the interest of the executives, fund managers and traders to limit the amount of leverage they use. This is because the payoffs for financial firms operating with leverage are asymmetric —when times are good, leverage greatly enhances the profitability of financial firms as well as the paychecks of the people who work for them. But when the outcome of investments financed with leverage is bad, the people who invest in or work in financial firms rarely bear the full brunt of the losses their firm experiences. In fact, there is good reason to believe that financial market participants are, on average, paid more the more volatile and bubble prone the economy is, so they have little incentive to adopt prudent practices that help keep the economy safe from such disturbances.

For this reason, financial markets will not be self-correcting and self-regulating and the decisions that bank regulators make over the next few months and years are of critical importance. If financial firms and financial markets are not more tightly regulated to limit the

amount of leverage that can be used, the outcome will be more bubbles, more crashes and even greater income and wealth inequality as finance captures a growing share of society's resources.

Appendix

Legal and Regulatory Changes that Permitted Financial Institutions to Take on Excess Leverage

Non-Regulation of the Use of Off-Balance Sheet Entities to Hide Debt: Beginning in the late 1970s and early 1980s, regulatory and accounting rules passively allowed financial institutions to use "off-balance sheet" financing tricks in which they created new legal entities ("special purpose vehicles" (SPVs), or "special investment vehicles" (SIVs)) which sold securities and used the proceeds to purchase troubled assets from financial institutions. Thus, the assets were off the books of the financial institutions and isolated in the SPVs, and since the financial institutions were not contractually obligated to make good on the securities issued by the institutions, the transactions would have the effect of hiding the debt and bad assets from regulators and investors.[186]

Depository Institutions Deregulation and Monetary Control Act of 1980: The Depository Institutions Deregulation and Monetary Control Act of 1980 established a process for phasing out interest rate restrictions that applied to banks and thrift institutions and permitted depository institutions to begin offering accounts that could compete with money market mutual funds.[187] Money market accounts at banks have not been subjected to the same reserve requirements as checking or regular savings accounts.

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[186] *See* Al L. Hartgraves & George J. Benston, *The Evolving Accounting Standards for Special Purpose Entities and Consolidations*, 16 ACCT. HORIZONS 245, 247 (2002) (discussing the lack of regulation for SPE's); *see generally* Elaine Henry, Oscar J. Holzmann & Ya-wen Yang, *The Recent Credit Crunch and GAAP*, 19 J. CORP. ACCT. & FIN. 89 (2008).

[187] 1 FEDERAL DEPOSIT INSURANCE CORP., HISTORY OF THE 80S: LESSONS FOR THE FUTURE 91-93 (1997) *available at* http://www.fdic.gov/bank/historical/history/ (explaining how the government aimed to increase competition and remove differences); FED. RESERVE BANK OF BOSTON, DEPOSITORY INSTITUTIONS DEREGULATION AND MONETARY CONTROL ACT OF 1980, *available at* http://www.bos.frb.org/about/pubs/deposito.pdf ("The act has nine titles covering a wide range of subjects, including reserve requirements, access to and pricing of Federal Reserve services, a phaseout of Regulation Q and new powers for thrift institutions.").

Approval of Less Strict Accounting Rules by the Federal Home Loan Bank Board: In 1981, in hopes of avoiding forcing too many thrift institutions into receivership, the Federal Home Loan Bank Board approved less strict accounting rules. These weakened rules made it possible for thrifts to delay recognizing losses on assets, allowing them to operate with less in the way of actual assets than they would have needed to meet capital requirements under prior rules while the regulators looked the other way. Some thrift institutions began trying to attract funding from the "money markets" (markets for short term debt) in addition to deposits.[188]

Weakening of the Banking Act of 1933 (Glass-Steagall Act): Restrictions preventing banks from engaging in investment banking activities, in place since the 1930s, were weakened steadily from 1986 through 1999 as the Federal Reserve reinterpreted the restrictions in ways that allowed banks to begin to invest in and trade commercial paper, municipal bonds and mortgage-backed securities.[189]

Basel I: The U.S. signed on to the first Basel Agreement (Basel I) in 1988, which recommended that banks in countries that are part of the agreement should be required to maintain capital ratios of at least 8%—equivalent to a leverage ratio of a little less than 12 to 1.[190] Basel I (officially the Basel Committee on Banking Supervision of the Bank of International Settlements) is an international agreement on banking regulation but applies only to banks, and it has no force of law. U.S. banks immediately began resisting this standard as too restrictive.[191]

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[188] MATTHEW SHERMAN, CTR. ECON. & POLICY RESEARCH, A SHORT HISTORY OF FINANCIAL DEREGULATION IN THE UNITED STATES 7 (2009) ("The legislation authorized thrifts to engage in commercial loans up to 10 percent of assets and offer a new account to compete directly with money market mutual funds.").

[189] *Id*. at 8-10 (recounting new markets that banks were allowed to enter).

[190] TARULLO, *supra* note 59, at 55 (discussing the agreement's tiers and 8% requirement).

[191] *See id*. at 64 ("As would be the case in Basel II, this conceptual overhaul was prompted by the loud and persistent complaints of internationally active banks.").

The Financial Modernization Act of 1999 (Gramm-Leach-Bliley Act): The Gramm-Leach-Bliley Act repealed the Glass-Steagall Act, eliminating all restrictions against the combination of banking, securities and insurance operations for financial institutions and all restrictions that had prevented banks from engaging in many of the activities and practices that investment banks, brokerage firms and even private investment companies engage in.[192] The passage of this act is significant because securities firms and investment banks are regulated only by the Securities and Exchange Commission, not by the Federal Reserve or other bank regulators and are not subject to the same supervision or capital restrictions as banks.[193]

Commodity Futures Modernization Act of 2000: Federal Reserve Chairman Alan Greenspan and Treasury Secretary Robert Rubin quashed initial efforts by the Commodity Futures Trading Commission to begin regulating new derivative instruments, such as credit default swaps, in the late 1990s, and Congress sealed the deal in 2000 when it passed the Commodity Futures Modernization Act of 2000, which exempted derivatives from regulation.[194]

Basel II: Signed in 2004, Basel II loosened limits on capital and provided that assets should be "risk-weighted" so that a bank with lower risk assets can be allowed to operate with less capital.[195] The Fed allows large banks to use their own internal risk models to determine the "risk-weighted" value of their assets.[196]

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[192] SHERMAN, *supra* note 188, at 10 (exploring the effect the Gramm-Leach-Bliley Act had on commercial banking).

[193] Jim Zarroli, *With Change, Era Of Investment Banks Ends* (NPR radio broadcast Sept. 22, 2008) *available at* http://www.npr.org/ templates/story/ story.php?storyId=94900635 (discussing how bank holding companies are regulated by the Federal Reserve).

[194] *See generally* The Commodity Futures Modernization Act of 2000, Pub. L. No. 106-554, 114 Stat. 2763 (2000).

[195] TARULLO, *supra* note 59, at 124-26 (charting the credit risk framework of Basel II).

[196] *Id*. at 135 ("[T]he committee evidenced no reconsideration of the . . . disquiet with the role of external rating agencies in Basel II, much less with the core reliance of the IRB approaches on internal risk models.").

2004 SEC Rule: In April 2004, the Securities and Exchange Commission promulgated a rule which allowed large broker dealers to evaluate assets based on their own internal risk models, thereby outsourcing duty to monitor risk to the regulated banks.[197]

[197] *See generally* 17 C.F.R. § 240.15c3-1 (2010); *see also* Securities & Exchange Commission, Final Rule: Alternative Net Capital Requirements for Broker-Dealers That Are Part of Consolidated Supervised Entities (June 8, 2004), http://www.sec.gov/rules/final/34-49830.htm#P22_3483 ("These amendments are intended to reduce regulatory costs for broker-dealers by allowing very highly capitalized firms that have developed robust internal risk management practices to use those risk management practices, such as mathematical risk measurement models, for regulatory purposes.").