

The Plight of Modern Markets:

How Universal Banking Undermines Capital Markets

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Abstract: This paper explains the process of competitive deregulation that led both the U.S. and the U.K. to embrace universal banking and to abandon the functional separation of financial activities that had long characterized their financial systems. The paper argues that some of the consequences of favoring universal banking over functional separation that were understood in the 1930s were rarely voiced in years preceding deregulation. The principal argument offered in favor of separation was that the commercial banking system, which is supported by a government “safety net,” needs to be protected from the risks inherent in investment banking. By contrast, this paper argues that functional separation played an important role in protecting capital markets from the banking system.

Universal banking is associated historically with thinly traded stock markets, and this paper argues that universal banking promotes the formation of a small group of large dealer-banks which dominate the financial system and whose interests are best served by trading on non-public over-the-counter markets. The paper finds that just such a group played a key role in the growing importance of such over-the-counter markets in the U.S. over the past few decades.

The paper then argues that the benefits of the greater liquidity that large universal banks can provide to capital markets are offset by the dangers they create when they err. Because mistakes at these large banks are often allowed to grow in size to match the size of the banks, they distort prices on financial markets and sometimes create systemic risk. Two recent examples are given: J.P. Morgan Chase Bank’s “London whale” fiasco and UBS, Merrill Lynch and Citibank’s exposures to subprime mortgages.

Finally, the paper explains that the Senate Report on the Glass Steagall Act indicates that the Act was designed in part to limit commercial bank participation in the margin loan market, as this activity makes possible a feedback loop between increases in the money supply and increases in asset prices, which in turn can generate an asset price bubble in capital markets. The recent crisis has led modern researchers to rediscover the relationship between margin lending, feedback loops, and asset price bubbles that was well understood by at least some legislators in the 1930s. The paper argues that the recent crisis demonstrates that modern banking regulation needs to be informed by an understanding of the consequences that may arise when a financial system is dominated by universal banks.

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The financial crisis of 2007-08 took place subsequent to several decades of regulatory reform which had the effect of transforming the U.S. and U.K. financial systems. These reforms put an end to the long-standing tradition of functional separation that had characterized Anglo-American finance for more than a century and they created an environment where both banking and financial markets were dominated by a small group of universal banks, or banks that provided a full range of banking and capital markets services. This paper explains that functional separation was not just designed to protect banks from the risks inherent in capital markets, but equally importantly protected capital markets from being distorted and disrupted by the participation of commercial banks in secondary markets for securities. The adverse effect that commercial bank participation can have on capital markets is not well-recognized, and this lacuna in our understanding of financial markets almost certainly played an important role in the regulatory reforms that led to the growth of universal banks.

While this paper argues that functional separation was eliminated in no small part because its purpose was not well-understood, from a policy perspective the goal of this paper is modest. By explaining the intellectual framework that underlay functional separation, this paper hopes to take small step towards the improvement of modern financial regulation. I do not propose here that functional separation should be reinstated, instead I argue that modern regulation will be more effective when the regulators who implement it have a better understanding, such as that presented here, of the full spectrum of costs that are associated with universal banks. Because the goal here is not to argue for the reinstatement of functional separation, this paper discusses the benefits of universal banking relatively briefly and does not purport to offer a definitive cost-benefit analysis of universal banking.

The first section of the paper briefly reviews the literature on universal banking. In the second section of the paper, first, the rules that supported functional separation in Anglo-American financial markets are discussed, then, the incremental steps by which this separation was eliminated, and, finally, the origins of universal banking in these two countries. Sections three through five explain the various costs that arise when universal banks are formed by allowing commercial banks to be dealers in securities markets focusing on three significant adverse effects.

Section three of the paper first explains that the market structure that is most advantageous for a large dealer is one where prices are not transparent, as dealers can profit from their informational advantage relative to those who trade on the markets. This then implies that to the degree that universal banks can influence financial market structure they will prefer to reduce the use of securities exchanges, and this in turn may explain the association that we find between markets dominated by large universal banks and

the predominance of over-the-counter rather than exchange trading on these markets. Finally the recent role played by modern universal banks in promoting the growth of a large, unregulated over-the-counter market in swaps is discussed.

The fourth section of the paper studies the consequences of universal bank errors that grow so large that market prices are distorted. A first case presents the unequivocal evidence of a price distortion caused by an acknowledged universal bank mistake, J.P. Morgan Chase Bank's London Whale episode. A second case discusses the adverse effects on mortgage market price signals caused by the underestimation by three universal banks of the risks of subprime mortgage lending.

The fifth section of the paper explores the relationship between universal banking and asset price bubbles. This section starts by presenting a hypothesis that was originally explained in the Senate Report on the Glass Steagall Act: because of the important role that banks play in expanding the money supply, when commercial bank loans are over-collateralized by securities the supply of loans will be demand driven, and in the presence of either procyclicality or adverse selection, a feedback loop will be created in which increases in the money supply and in asset prices feed on each other creating an asset price bubble. Both the 1920s stock market bubble in the U.S. and the 2007-08 crisis are explored using this framework. The sixth section concludes.

I. RELATED LITERATURE

There is an extensive literature on universal banking, and readers who seek a more thorough review of the literature than there is space for here are referred to Guinanne (2002). Here, we briefly discuss certain key points with respect to this literature.

The foundations for the debate over the relative merits of universal banking and of functional separation between financial intermediaries were laid by Alexander Gerschenkron's (1962) essay on the important role played by German universal banks in the industrial growth of the German economy. Because Gerschenkron focused on German banking as a domestic institution and because of the seminal role that his work has played in the literature, much of the subsequent work has failed to take into account the central role of British finance in the period under discussion or the fact that there were important ways in which the German banking system was dependent on the British banking system at this time. As Sissoko (2016) observes Britain's carefully structured money market addressed the informational problems of banking at both the micro- and the macro-economic level, making it possible for foreign, as well as domestic, business activity to be financed by private sector expansion of the money supply. Thus, it is

misleading to view British and German banks in this period as simply national institutions, because this ignores the fact that the German export trades were heavily dependent on the British banking system and the inexpensive credit that it made available.¹ Because of the core-periphery relationship between British and German banking, works that claim that German finance equaled or even bested British finance but that fail to address the role played in the German economy by the low cost finance available on the London money market are flawed. For example, Fohlin (1998), Fohlin (2000), and Chirinko and Elston (2006) seek to demonstrate the superiority of German banking by focusing on the degree to which financial structure imposes or does not impose costs and credit constraints on industry without mentioning the finance of German economic activity on international money markets. While Tilly (1998, p. 11) recognizes that Britain had “the most efficient financial markets in the world,” he does not draw the connection between access to such low cost finance and the reduction this implies in the long-term funding needs of businesses – which then have access to the alternative of rolling over cheap short-term debt.

Not only does much of the literature focus on domestic industrial finance and ignore the international importance of the liquidity services that are the *raison d'être* of commercial banking, but few papers address the issue of universal banking's effect on the quality of financial markets, which is the focus of this paper. U.S. Supreme Court decisions that laid out the legislative purpose behind the Glass Steagall Act may have played an important role in this aspect of the literature. Initially a 1971 decision discussing the legislative purpose of the Act addressed somewhat elliptically the problem of price formation on financial markets by referring to “the more subtle hazards that arise when a commercial bank goes beyond the business of acting as fiduciary or managing agent and enters the investment banking business.”² Then, a decade later when this case is used as a foundation for further interpretations of the Act, these “subtle hazards” are reinterpreted to refer only to the conflicts of interest that may arise when commercial banks engage in investment banking.³ As a result of this evolution in the official interpretation of the

¹ As Tilly observes, through the seminal period of German industrialization “German banks made increasing use of British banking and money market facilities because they were generally more efficient or cheaper than any other” (Tilly 1992, p. 109). Indeed Germany accounted for a quarter of London's international trade credit in 1913 (Cottrell 1992, p. 33).

² *Investment Co. Inst. v. Camp*, 401 U.S. 617 (1971).

³ *Securities Industry Ass'n v. Board of Governors of Federal Reserve System*, 468 U.S. 137 (1984); *Securities Industry Ass'n v. Board of Governors of Federal Reserve System*, 468 U.S. 207 (1984); *Board of Governors of Federal Reserve System v. Inv. Co. Inst.*, 450 U.S. 46 (1981).

Act's purpose, many subsequent analyses of the Act, including Macey (1984) and Calomiris (1995), have apparently assumed that the Court's view was correct and treated the law as having two goals: first, to promote the safety and soundness of the banking system and, second, to protect bank customers by preventing banks from taking advantage of conflicts of interest created by securities dealing.⁴ Thus, the emphasis of many works that are supportive of universal banking is on the analysis of the effects on banking with only limited discussion of the effects on markets (e.g. Calomiris (1995) and Benston (1990)).

Indeed, an important segment of the literature on universal banking focuses entirely on the issue of conflicts of interest in 1920s U.S. banking (Kroszner & Rajan 1994, Ang & Richardson 1994, Puri 1994, Puri 1996). The conclusion of Puri (1996) which finds that commercial banks underwrote higher-priced – and arguably higher-quality – debt securities and which rejects the view that investors were harmed due to commercial bank conflicts-of-interest when underwriting securities, unfortunately summarizes this literature in a way that omits an important result.⁵ The result that the Puri (1996) summary omits is the finding that “rogue” commercial banks, which underwrote more than 40% of all commercial bank underwritten bonds over the period analyzed by Puri,⁶ had underwritings that defaulted significantly more often than other bonds (Puri 1994, Ang and Richardson 1994). As long as all we know is that investors paid more for commercial bank underwritten securities – with no data on the relative prices of rogue and non-rogue underwritings, then the data is entirely consistent with the view widely held in the 1930s that rogue banks induced investors to pay high prices on bonds which would later perform poorly. Thus, while it is possible that policy-makers of the 1930s erroneously failed to distinguish between “rogue” and “non-rogue” commercial banks, it is false to state that the empirical data is inconsistent with the view that *some* commercial banks “had underwritten and sold unsound and speculative securities, [and] published deliberately misleading prospectuses...”⁷

⁴ On this issue see also Wilmarth (2005, pp. 585, 591ff.).

⁵ Puri (1996) states: “[I]nvestors were willing to pay higher prices for bank-underwritten securities. This result, along with the results of lower long-term default performance of bank-underwritten corporate securities (see Ang and Richardson, 1994; Kroszner and Rajan, 1994; Puri, 1994a) confirms that investors’ perception of the value of bank underwritings was *ex post* accurate in that these securities defaulted less, in the long run, than similar investment-house underwritings. There is, therefore, no evidence that investors or firms suffered from potential conflicts of interest in bank underwritings.”

⁶ Data from Ang & Richardson (1994, pp. 387-89).

⁷ Kroszner and Rajan (1994).

Even if the empirical literature on the conflicts of interest view had in fact rejected it, that view is distinct from the one presented in this paper. The empirical literature evaluates commercial banks that engage in underwriting, not universal banks in the modern sense of the word, where full service broker-dealers are combined with commercial banks. As is discussed in section II, the conflicts of interest relevant to this paper are those associated with securities dealing, an activity that is different from underwriting – and these conflicts cannot be studied using data from the 1920s.

This focus on the role played by universal banks in primary markets, instead of on the role they play in secondary markets characterizes not just the literature on conflicts of interest, but also the bulk of the literature on universal banking itself. Thus, when Calomiris (1995) analyzes the inefficiencies that may arise due to a concentrated banking sector his focus is entirely on the question of whether the costs of finance to industrial firms are raised – in other words, on primary markets for securities. This paper presents a very different set of inefficiencies that arise from the participation of universal banks in secondary markets and their effects on the market pricing mechanism. Similarly, when Calomiris (1995) argues that universal banks can mitigate problems of asymmetric information across the life cycle of industrial firms, the focus is again on primary markets: universal bank economies of scope facilitate the transition from early stage bank lending to debt IPOs and then to equity IPOs.⁸ Because this paper seeks only to shine light on the costs created by the participation of universal banks in secondary markets and does not purport to present a definitive cost-benefit analysis of universal banking, the potential for universal banks to ameliorate information problems in primary markets is acknowledged here without further comment.

This paper argues that the Glass-Steagall Act is best understood as an effort to protect the soundness of the financial system, and the stock market in particular, by establishing firewalls that would ensure that the credit created by the banking system could not be used to distort stock and bond market prices. A few authors take a similar approach. Ratner (1978, p. 329) is an early work that argues that universal banking will promote concentration in the financial industry and have the effect of harming the public.⁹ Guinnane

⁸ While there is some empirical support for this view, it is far from conclusive (Calomiris 1995, p. 304; Tilly 1996, p. 409; Schenone 2004). See also Guinnane (2002, pp. 110-11).

⁹ Ratner writes: “[T]he idea of genuine competition over an extended period between banks and securities firms is illusory. Because of the competitive advantages that can be obtained by combining securities activities with commercial banking, I suspect that in the long run the firms without commercial banking connections would either be absorbed or driven out of the business altogether. This would result in an increased concentration of economic power . . . without any significant countervailing benefits to consumers.”

(2002, pp. 110, 114-15) argues that the concentration associated with universal banking can easily lead to collusion and inefficiencies due to the banks' exploitation of their asymmetric information. This paper explores these ideas with a detailed discussion of securities dealing and by relating the argument to recent experience.

A few authors seek to refute the claim that universal banking has adverse effects on securities markets. Fohlin (2007) gathers evidence in favor of the compatibility of universal banking and securities markets in Germany – without finding any evidence that is clearly inconsistent with the view that the quality of markets is adversely affected by universal banking.¹⁰ Tilly (1998, pp. 11, 20) questions the significance of the “securitization gap” and argues that “the uniqueness of universal banking as a system of finance lies in . . . the relationship between universal banking operations and the security markets.” Benston (1990) discusses and dismisses concerns about the quality of German securities markets¹¹ and critiques the argument that commercial bank securities activities had the effect of increasing securities prices. He starts the latter commentary, however, by discounting as implausible the possibility that bank credit could affect securities prices, and then states that “the Glass-Steagall Act does not prevent banks from lending to securities brokers or purchasers” without addressing the fact that the Act puts such lending completely under the control of the Federal Reserve.¹² This paper lays out the opposing case by focusing on issues such as the asymmetric information problems inherent in securities dealing, the natural advantages that

¹⁰ Fohlin (2007, pp. 633-34) points out that funds raised on securities markets played an important role in the finance of German industry, and therefore the weakness of the market should not be exaggerated. She also (pp. 632-33) tests for a difference in performance between the shares of firms with and without close ties to a bank, but acknowledges that her data cannot answer the question of whether universal banks influenced the prices of all shares trading on the market. Fohlin (2000, p. 5) also makes the claim that her data shows that the hypotheses that underdeveloped markets either necessitate universal banking or stem from it “fail[] as a general principal.” The reasoning behind this claim is, however, not entirely clear. She compares the ratio of U.S. commercial bank assets to stock market capitalization with the ratio of German universal bank assets to stock market capitalization and finds that the latter is much smaller than the former, but does not explain why it is appropriate to compare U.S. commercial banks to German universal banks, instead of a broader category of German banks. She notes that stock market capitalization as a share of GDP was greater in early 20th c. Germany than in the U.S., but then observes that the reverse is true for domestic securities issued as a percentage of GNP. Her point appears to be that these particular data points do not mark Germany as having an underdeveloped stock market, but this underdevelopment is a fact that is already established by other comparisons (see for example Guinnane 2002, p. 73), and she would need to explain why the particular data she has chosen to evaluate should be weighed more heavily than other data.

¹¹ Benston addresses the quality of German markets in a cursory manner, pointing out, first, that amongst many factors there is no reason to attribute the cause of weak markets to universal banking, and second, that most likely competitive markets would produce deeper securities markets if Germans wanted them. He apparently is abstracting from problems of asymmetric information and the interaction of these problems with market power.

¹² Section 9 of the Glass-Steagall Act explicitly authorizes the Federal Reserve to curtail all lending to a bank that increases security-based loans after the Fed has cautioned the bank, and Section 11 imposes a stiff fine on any member bank that intermediates lending by non-banks to the brokers and dealers.

commercial banks have when they enter into the business of securities dealing, and the problems that can arise due to procyclicality and adverse selection.

II. FROM FUNCTIONAL SEPARATION TO UNIVERSAL BANKING

In the early years of the 20th century, both the U.S. and England had very active and strong financial markets, and in each country the rules of the stock exchange played an important role in separating financial activities into functions that were performed by different firms. In the latter half of the 20th century the U.S. started the process of deregulation and by the end of the century in both countries financial markets were dominated by universal banks.

A. The Functional Separation of Financial Intermediation in the U.S. and England

At the turn of the 20th century the London Stock Exchange (“LSE”) was the most important stock exchange in the world, as the London market was an important venue for financing infrastructure projects around the world. The LSE also had a unique structure and subjected its members to remarkably strict rules that governed the Exchange until 1986.

The London exchange imposed “single capacity” on members, requiring each to declare annually both whether he was a broker or a dealer, and that he engaged in no other business. Any partners of an exchange member were required to also be members of the exchange and were required to perform the same role on the exchange.

Thus exchange member firms were either brokers who executed trades for customers and earned their income from commissions, or dealers who posted bid and ask prices for stocks, were prohibited from dealing directly with non-exchange members, and earned their income from the bid-ask spread and from trading for their own account. The single capacity rule had its origins in the 19th century, and was viewed both then and up to the mid-1980s as “an elegant and highly effective means of investor protection,” because it minimized the conflicts of interest to which financial intermediaries were exposed (McMahon 1985; London Stock Exchange Commission 1878; Chiswell 1902; Loehnis 1987; Michie 2001).

Exchange rules also prohibited corporations from being members. The prohibition on corporate membership was adopted in the 19th century in England and was likely influenced by the slow embrace of the corporate form in Britain and the initial view that only a limited number of industries – that did not include capital market intermediaries – had capital needs that justified incorporation (see McQueen 2013, pp. 133-35). Commercial banks by contrast required access to a large pool of capital, and by the start of the 20th century the commercial banks were almost all corporations. By the mid-20th century the

prohibition on corporate membership was understood as protecting the market from being dominated, as some of the exchanges in continental Europe were, by a small group of large banks that could “dictate prices” and undermine the competitive foundations of the London exchange’s market pricing mechanism (Michie 2001. See also Bank of England 1984).

Overall, in Britain the rules of the Stock Exchange explain much of the functional separation that characterized the British financial system: brokering, dealing, and underwriting were segregated activities, and the only capital market activity which was potentially open to a commercial bank was underwriting. By custom, however, the underwriting business was dominated by unincorporated merchant banks.¹³

The rules were less strict on the New York Stock Exchange (“NYSE”) where brokers were permitted to deal. The exchange prohibited only acting as broker and dealer in the same transaction – that is, receiving a commission while at the same time taking the other side of the client’s order. As a result of the less stringent rules adopted by the NYSE, in U.S. capital markets investment banks underwrote securities issues, had partners who were members of the Exchange, and both brokered and dealt not only in exchange-traded securities, but also in the over-the-counter securities that traded outside the Exchange. In short, a wide range of capital market functions was performed by U.S. investment banks.

The NYSE rules did prohibit corporate membership on the exchange, and, just as was the case in Britain, this had the effect of prohibiting commercial banks from being members of the exchange. Exchange rules did not, however, govern underwriting activities or trade that took place in other venues than the exchange. Furthermore, because the New York exchange restricted the securities that could be traded on the exchange (whereas the London exchange did not), the majority of securities – most of which traded very infrequently – did not trade on the NYSE and were not covered by its rules.

In the U.S. statutory restrictions also played a role in limiting the activities of commercial banks, but these restrictions changed over time. In the late 19th century the Supreme Court interpreted the National Bank Act to prohibit nationally chartered banks from dealing in non-government securities or investing in

¹³ Although no law similar to Glass-Steagall had ever been adopted in Britain, the separation of merchant (or investment) banks from commercial banks in London was an institutional fact. (Stourton 2010. See also McMahon 1985).

equity securities.¹⁴ In the early years of the 20th century, however, national banks started to use securities affiliates that were chartered under state law and not subject to the National Bank Act to underwrite and place new issues of securities, including equities.

By the 1920s such activities were implicitly approved, as the Federal Reserve accepted as members state-chartered banks that used affiliates to engage in underwriting (Perkins 1971). In February 1927 the McFadden Act sought to even the playing field between national and state-chartered banks by, amongst other changes, authorizing national banks to underwrite securities. From 1926 to 1927, the value of new securities issues increased by more than 30% and continued to increase for the next two years (Federal Reserve Board 1943). By 1930 the market share of commercial banks and their securities affiliates had grown so large that they were underwriting more than half of all securities issues.¹⁵

Observe, however, that claims that “the institutional separation of banking functions [in the U.S.] was, by the end of the 1920's, a thing of the past” (Perkins 1971, p. 496) are overstated. While commercial banks had become important players in the business of underwriting new issues, there is little evidence that they were playing an important role in brokering and dealing on secondary markets, and it is certain that they were not brokering and dealing in the most frequently traded securities, because almost all trade in those securities took place on the NYSE, where the doors were closed to the commercial banks. In short, by 1930 commercial banks in the U.S. played a significant role in capital markets, but one that was also circumscribed by the rules of the stock exchange.

The logic behind the exclusion of corporations, and therefore commercial banks, from the stock exchange was understood in the U.S., as it was in Britain, as a means of protecting the quality of the price formation process in secondary markets for securities. Specifically the policy was designed to ensure that there was a competitive pricing mechanism on the exchange and that the exchange was not dominated by a small number of large commercial banks. Indeed in 1930 a NYSE official declared that it is a principle of Anglo-American finance that both the money market and the stock market are best served when “stock brokerage is organized as a specialized business separate and distinct from commercial banking”

¹⁴ First National Bank v. National Exchange Bank, 92 U.S. 122 (1875); California National Bank v. Kennedy, 167 U.S. 362 (1897). Note that The National Bank Act was, however, also interpreted to permit loans secured by the stock of another corporation – but not loans secured by real estate – as collateral. Nat. Bank v. Case, 99 U.S. 628, 633 (1878). Thus, from the early years of their existence U.S. banks were permitted to hold stocks not as an investment but as a consequence of their lending activities.

¹⁵ Letter from Kathryn Fulton, Director SEC Office of Legislative Affairs to Elisse Hoffman and Timothy Forde at 3 (June 24, 1994), *available at* www.sechistorical.org. See also Perkins (1971, pp. 495, 527).

(Meeker, 1930, p. 652). He characterized the German market, where retail banks participated actively on the exchange, as having the properties of a “money trust,” and described the brokerage business there as “largely swallowed up by a few powerful incorporated banking institutions” which prevented the “development of a ‘free and open’ market of the type maintained by the stock exchanges of New York and London.”

In 1933 the Glass Steagall Act would be passed, prohibiting commercial banks from dealing in, underwriting or distributing non-governmental securities or from affiliating with a company that did so. This took place only six years after the McFadden Act, so the reversal of policy was dramatic. As will be discussed in Section V, Congress found that the experiment with commercial bank underwriting of securities had gone badly wrong.

B. Reform of the Stock Exchange: The Beginning of Competitive Deregulation

While the Glass-Steagall Act reaffirmed the functional separation of financial activities in the U.S., within half a century this separation would begin to erode. The transition from functional separation to universal banking began with the reform of the rules governing the stock exchange. In both the U.S. and the U.K. this took place in two steps: first, corporate membership was permitted on the exchange, and, then, fixed commissions were eliminated.

With the rise of institutional investors who place large orders, the capital needs of LSE members began to exceed their capacity in the middle of the 20th century. Thus, in an effort to increase access to capital while reducing the danger that the market would be dominated by a few very large dealers, the LSE permitted its members to form limited partnerships in 1965, while at the same time explicitly excluding financial institutions, such as banks and securities issuers, as possible partners. Insufficient external capital was forthcoming, and in 1969 the London Stock Exchange permitted investments by financial institutions in member firms, but also required that 51% of the shares be held by Stock Exchange members (Michie 2001).

Similar pressures led the NYSE to allow members to go public and become corporations in 1970.

Although this opened the door for commercial banks to own NYSE member firms, bank regulation would also have to evolve before commercial bank participation on the exchange became a reality – and this would take more than a decade.

Then in 1975 the NYSE eliminated the rules of the exchange that fixed commissions and replaced them with negotiated commissions. The costs of trading plummeted both for those who placed large orders and for retail traders. Almost immediately 250 small brokerage firms went out of business, and dozens more

merged into larger firms (Sobel 1975). In short, this reform had the effect of favoring large firms that could offer significant discounts to very large accounts or provide services to large numbers of retail traders, and was a major step in the consolidation of the industry.

Just seven years later, Bank of America Corporation applied to the Federal Reserve for approval to acquire all voting shares of a discount brokerage and NYSE member firm. Not only did the bank receive approval, but the Federal Reserve's new interpretation of the Glass-Steagall Act was affirmed by the Supreme Court in 1984.¹⁶

By this date the LSE and its members found themselves in direct competition with New York financial markets and New York investment banks due to several factors that drove the increasing internationalization of financial markets including: the lifting of exchange controls that had interfered with cross-border investment, technological innovations that reduced the cost of long-distance communication, and the growth of portfolio management techniques that emphasized diversification (McMahon 1985; Michie 2001). The consolidation of the industry in New York into one dominated by larger and larger banks who could easily provide liquidity by trading sizable block orders that would have been viewed as too large and too risky a decade earlier, thus, had ramifications for London. As a result of this competition, a Bank of England official observed: "a number of major UK shares were being more heavily traded in New York than in London," and "some of this activity came from UK fund managers" (McMahon 1985). The conclusion was inevitable: in order to be competitive the LSE had to be reformed.

Minimum commissions were viewed as anti-competitive by the Thatcher government and were the top of the list for reform (Lawson 2006).¹⁷ The demise of minimum commissions was expected to result in the consolidation of the industry and to put a premium on large, well-capitalized firms. As the most likely sources of an influx of new capital were the domestic commercial banks and foreign banks, the rules restricting corporate membership and the ownership of an exchange member firm were eliminated

¹⁶ Sec. Industry Ass'n v. Bd. of Governors of the Fed. Reserve Sys., 468 U.S. 207 (1984).

¹⁷ This conclusion was, perhaps, drawn a little too quickly. Because negotiated commissions favor large firms, fixed commissions can be viewed as a means of ensuring that entry of broker-dealers into the market is relatively easy and of preventing large firms from dominating the market. Since large firms have more information about trading flows, and thus more opportunities to profit from their asymmetric information, fixed commissions can promote efficiency by ensuring that there is a healthy population of competing market making firms, and by limiting trade on the basis of asymmetric information.

entirely (McMahon 1985; Ingram 1987).¹⁸ Furthermore, few believed the single capacity rule could survive without minimum commissions, so the segregation of brokers and dealers was also eliminated. In short, in one fell swoop all of the rules that underlay the uniquely segregated structure of London financial markets were cleared away on October 27, 1986 in an event known as the “Big Bang.” Shortly after the Big Bang, the Financial Services Act replaced the rules of the Exchange with a unified statutory framework for securities regulation in the U.K.

Two immediate effects of the Big Bang were that all stock exchange members switched to the corporate form and most of them became part of a commercial or investment bank.¹⁹ While the costs of trading fell significantly for large trades, the costs for small investors stayed more or less at the same level they had been before the reform (Ingram 1987; Loehnis 1987).

A variety of longer term consequences were anticipated by the Bank of England’s Deputy Governor Kit McMahon even before the reforms were adopted. Single capacity had been an effective form of investor protection, which “facilitated prudential supervision” and made it easy to maintain high standards of behavior in the market. As a result of its elimination British regulators would have to find “new solutions to the problems of conflicts of interest” (McMahon 1985; Loehnis 1987). He was far from confident that reporting and other public disclosure requirements would be sufficient to address these problems. Deputy Governor McMahon also remarked that with the consolidation of the industry into universal banks, contagion was likely to be a much greater problem in the future as a failure in one market was more likely to “contaminate” participants in other markets. Most remarkably, he recognized – in 1984 – that finance was losing its character as an industry that facilitates the development of other industries and was “becoming a self-sustaining industry on its own ... One may wonder how far this process can or should go.”

C. The Culmination of Competitive Deregulation: Universal Banking

¹⁸ Note that whereas McMahon observed – in 1984 – that “the removal of minimum commissions therefore gave rise to pressure for the removal of the institutional demarcation, not just between principals and brokers, but also between banks and broker-dealers,” Lord Lawson would later remark that the end of the separation between merchant (i.e. investment) and high-street (i.e. commercial) banks was something he didn’t “give a great deal of thought to at the time” and that it was an “unforeseen consequence” of the Big Bang (Stourton 2010).

¹⁹ See Mark Whitehouse, *'Big Bang' Pioneers Rethink Banking Overhaul*, WALL ST. J., Mar. 31, 2009, <http://online.wsj.com/article/SB123844838879571027.html>; *London Insiders Remember Big Bang*, BBC NEWS, Oct. 26, 2006, <http://news.bbc.co.uk/2/hi/business/6081314.stm>.

The abrupt switch that took place in London from a financial system that was characterized by functional separation to one that was very quickly heading towards a universal banking model raised serious concerns in the United States about the competitiveness of the U.S. financial sector. Within a year the Congressional Research Service would issue a report studying the repeal of the Glass-Steagall Act, and in December 1986 the Federal Reserve reinterpreted the Act to permit bank holding companies to establish subsidiaries that underwrote corporate securities as long as the revenues from underwriting “ineligible” securities remained below 5% (Congressional Research Service 1987; Federal Reserve Bulletin 1987; Mester 1996). After the Supreme Court approved this action²⁰ the Federal Reserve in 1989 also authorized dealing in corporate securities and raised the revenue cap to 10%, and then in 1996 raised the revenue cap to 25% (Kwan 1997; Mester 1996). A comparable sequence of rulings by the Office of the Comptroller of the Currency that were upheld by the Supreme Court in the 1990s permitted commercial banks to sell insurance (Markham 2010).²¹ Furthermore, with the birth of the tri-party repurchase agreement market, which will be discussed in detail in Section V, bank intermediation of non-bank margin loans also began to grow in the mid-1980s (Skyrm 2013).²² Thus, the rollback of regulatory restrictions in the interests of ensuring that commercial banks could compete with universal banks internationally both permitted commercial bank affiliates to engage in the full range of capital markets activities and served as a *de facto* repeal of the Glass-Steagall Act.

Indeed, this regulatory repeal was so effective that through much of the 1990s it was the investment banks and the insurance companies that lobbied for a law repealing the Act, in order to facilitate their own entry into commercial banking. The commercial banks were for several years opposed to formal repeal of the Act, in part because such legislation was likely to narrow rather than to expand the scope of their activities. Thus, the announcement of the merger between Citicorp, one of the largest commercial banks, and the Travelers Group, an insurance and investment banking conglomerate, played a significant role in

²⁰ Securities Industry Association v. Board of Governors, 839 F.2d 47 (2d Cir.), cert. denied, 486 U.S. 1059 (1988).

²¹ Note that the Garn-St. Germain Depository Institutions Act of 1982 was apparently successful in preventing the Fed from promoting the expansion of commercial banks into the insurance business.

²² See also: Letter from Richard Gregg, Commissioner of the Bureau of the Public Debt to Owen Carney, Office of the Comptroller of the Currency (May 7, 1990),

https://www.treasurydirect.gov/instit/statreg/gsareg/gsareg_gsr033i.htm.

the passage in 1999 of the Glass-Steagall repeal, because it garnered the support of a key commercial bank for a law that otherwise had very little commercial bank support (Suarez & Kolodny 2011).²³

Now that reform of both stock exchange rules and financial legislation has eliminated the barriers to universal banking that delimited finance in both the U.K. and the U.S. through the 19th and much of the 20th century, the financial sector in the U.S. and U.K. has grown increasingly concentrated, so that it is dominated by just a few very large banks.²⁴ The ratio of the assets of the three largest FDIC-insured depository institutions in the U.S. to the assets of the commercial banking system as a whole hovered around 10% from the 1930s through the late 1980s, but increased steadily for two decades and in 2007 was greater than 40% (Haldane 2010). In the U.K. the comparable ratio was approaching 80% in 2007 (Haldane 2012).

At the end of 2007, there were three FDIC-insured commercial banks in the U.S. with assets in excess of \$1 trillion. They were J.P. Morgan Chase Bank, Bank of America, and Citibank. In December 2007 the three largest U.K. banks were similar – or even larger – in size: they were Royal Bank of Scotland, Barclays, and HSBC. Each of these banks is affiliated with a broker-dealer, and their names frequently show up in the top 10 when league tables of capital market services are tabulated. Of course, the strongest evidence that universal banks dominate capital markets when the rules requiring functional separation are eliminated is the fact that the outcome predicted by LSE members in the 1960s was realized: since the 2008 crisis no stand-alone investment bank of significant size exists anymore.

The transition from a financial system characterized by functional separation to one dominated by a small group of universal banks had several consequences: the nascent universal banks actively promoted the growth of “dark” over-the-counter markets on which they would have a significant informational advantage; the universal banks are now so big that when they err, they distort market prices with in some cases serious consequences for the economy as a whole; and finally, the dismantling of the barriers between commercial banks’ ability to expand the money supply and the pricing function of capital

²³ Note that President Clinton’s “Third Way” which played an important role in shifting the Democratic Party in favor of financial deregulation also facilitated the repeal (see Suarez & Kolodny 2011).

²⁴ Remarkably, even when the underwriting of new issues is considered the data indicates that universal banks have a significant advantage over incumbent investment banks. In 1996 the Fed permitted information flows between the commercial bank subsidiary and the underwriter subsidiary of a universal bank, and within four years the fraction of IPOs run by universal banks quadrupled to exceed 50% (Neuhann & Saidi 2014). (Note that the measure of universal bank activity in this paper probably underestimates the role of universal banks, because the authors apparently exclude investment banks that purchase depository institutions from their measure.)

markets eliminated an important protection against the formation of asset price bubbles on Anglo-American capital markets. Each of these consequences is discussed in turn.

III. CONSEQUENCE 1: GROWTH OF “DARK” OVER THE COUNTER MARKETS

The LSE was the preferred venue for foreign countries and companies seeking to raise funds on capital markets in the early years of the 20th century and the NYSE was the most important stock exchange globally through most of the latter half of the 20th century. This history continues to be reflected in current stock market data: as of November 2015, the U.S. and the U.K. are still home to the largest stock markets by market capitalization, accounting for 37% and 9% of world market capitalization respectively.²⁵ By contrast, Germany is the canonical example of a country that industrialized in an environment with universal banks. The German stock market has always been tiny in comparison with Anglo-American markets and, even today accounts for only 2.5% of world market capitalization.²⁶

This section of the paper starts by exploring some of the structural characteristics that may account for the historical correlation that has been observed between financial systems that are characterized by functional separation and well-developed capital markets. In particular, Anglo-American markets are characterized by continuity of trade, transparency of prices, and liquidity, and all of these factors reduce the ability of those with asymmetric information about the market to profit from that knowledge. Thus, this correlation also reflects the fact that universal banks typically do not just have an informational advantage due to their size, but they also typically function in an environment where it is easier to exploit that advantage. As economic theory would lead us to expect that any small group of universal banks would advocate for policies that increase their profits, we may hypothesize that universal banks actively promote the use and growth of non-transparent trading venues instead of exchanges. We start the discussion of this hypothesis by discussing the structure of German capital markets, and then compare these characteristics to those of Anglo-American markets

A. Hypothesis: Universal Banks Prefer and Promote OTC Markets

The universal banks that have dominated the German financial system for more than a century have always played an important role in the German stock market, issuing, dealing in, and brokering shares. At

²⁵ Data from World Federation of Exchanges, Monthly Report, Nov. 2015 and London Stock Exchange, All Companies Report, Nov. 2015.

²⁶ Data from World Federation of Exchanges, Monthly Report, Nov. 2015.

the same time securities that are publicly issued and traded on the stock exchange have for decades – and probably for more than a century – played a much smaller role in the finance of German business than they did in the U.S. or Britain (Levine 2002; Bank of England 1984). This is, of course, a correlate of the stock market capitalization data discussed above.

Not only did German companies rely less on publicly traded securities for funding, but trading on German stock exchanges was less active than in Anglo-American markets. As late as the 1980s the German stock market was not a continuous market, but conducted daily batch auctions, a system that had been established a century earlier.²⁷ Due to the limited trading on the stock market, most trading occurred over the phone with and between the universal banks, in what would have been called an “over-the-counter” market in the United States (Bank of England 1984; Guinnane 2002; Fohlin 2007). By contrast, both the London and New York stock exchanges have offered continuous trading during the day since the 19th century.

For German markets data on the volume of shares traded in the early 20th century is not available. The data that is available indicates that the value of trade on the German exchange did not increase from 1884 to 1913, whereas estimates of the value of over-the-counter trades increase by 10% a year over this period (Fohlin 2007).²⁸ For comparison, the volume of shares traded on the New York Stock Exchange more than doubled from 1884 to 1909 and the value of shares traded more than tripled (Andrew 1910). Overall this data supports the conventional view that in these formative years, continuous markets like the New York Stock Exchange were more active and better able to foster exchange trading.

An important advantage of markets that trade continuously is that traders who wish to trade immediately do not need to wait for the batch auction or call up the banks one by one to get bids. Investors value immediacy, because delay can be costly: for example, if the investor expects the value of the trade to change over the course of the day. The alternative of calling up the banks allows the banks to charge a markup in exchange for immediacy, and this markup may increase if a bank is aware of the immediacy of the investor’s need for cash (because, for example, of a margin call) and adjusts its own bid to reflect that

²⁷ The pricing process dates from the latter years of the 19th c. and is described in Gehrig & Fohlin (2006). For the process in the 1980s, see Bank of England (1984).

²⁸ Note that Fohlin actually states that the ratio of the value of over-the-counter trading to exchange trading increases by about 10% a year.

knowledge.²⁹ The value investors place on the ability to cash out moderately-sized positions at the market price on demand without paying a bank markup for demanding immediacy likely explains the fact that many national exchanges have switched from batch auctions to continuous trading, but none have made the reverse move (Harris 2003).

Superior liquidity is the most important service that a stock exchange provides compared to other trading venues.³⁰ A liquid market is one where large transactions can be effected quickly without causing prices to move significantly; as a result, a liquid market offers not only immediacy, but also price continuity. Consider how important it is that a price quoted now be a reasonable approximation of the price the investor can get in a few minutes. In the contrary case where sudden, abrupt changes in price are constantly occurring, a price quotation is of little value. In short, on a liquid market price quotations are valuable, because others can expect to trade in the same market at a similar price.

Thus, one indicator of the value of the dynamism of Anglo-American financial markets is the fact that exchanges spent the latter part of the 19th c. establishing a legal property right in their intra-day price quotations and policing the dissemination of these quotes (Mulherin et al. 1991; Michie 2001). The value that was placed on these intra-day quotations is strong evidence that traders did indeed expect to be able to trade at a price similar to that quoted, and thus that markets were liquid. In order for there to be price continuity in addition to continuous trading on Anglo-American markets it was necessary for some dealer on the market to be willing to carry inventory when a large order was placed and to smooth the price fluctuations of thinly trade stocks (Harris 2003; Grossman 1989). On exchanges the general term for the dealers who provide this service is market makers.

²⁹ Two facts about the pre-World War I German stock market support this interpretation of the costs of the daily batch auction. Gehrig & Fohlin (2006) find that the daily volatility of returns on the Berlin exchange was comparable to that on modern markets, whereas DeLong & Becht (1992) find that the monthly volatility of a Berlin index exhibits extremely low volatility compared to both contemporary and modern markets. It is possible that the significant role played by universal banks in the trading market helped ensure that the index was a relatively accurate predictor of value, as DeLong & Becht speculate, but that the daily volatility of prices are an indicator that the banks were able to extract some of the value of that knowledge by allowing prices to adjust based on daily trading activity.

³⁰ This approach differs somewhat from that of Harris (2003, pp. 206-43) who claims that a “good market” is not only liquid, but also produces prices that are informative or “close to fundamental value.” This article takes an economist’s approach to the relationship between prices and fundamental value: while it is trivially true that economic forces work to eliminate opportunities for certain profits, there is no reason to believe that any given market price reflects fundamental value, and it is generally difficult if not impossible to demonstrate that any given market structure improves the “informativeness” of prices (Sissoko 2015).

Exchanges differ from over-the-counter (OTC) markets, because exchanges report both quotations and the prices of executed trades. Since quotations are not made public on OTC markets, traders have to actively seek out quotations, and the costs of doing so mean that dealers do not need to set their prices as competitively on OTC markets as they must on exchanges. Furthermore, the fact that executed trades typically do not need to be reported in OTC markets makes it very difficult for a trader to determine *ex post* whether the dealer gave her a good price.

To summarize, Anglo-American markets are characterized by continuity of trade, liquidity, and transparency of prices. All three of these factors reduce the ability of those with asymmetric information about the market to profit from that knowledge: In a continuous market, dealers do not have the opportunity to charge a premium to a trader who requires immediacy, because immediacy is provided by the market makers; similarly, both price transparency and market liquidity constrain the markup that a dealer can charge. OTC markets, by contrast, do not have these characteristics, leaving ample opportunity for OTC dealers to charge premia and markups, and thus to exploit their asymmetric information.

OTC markets are, in short, inherently more profitable for dealers than continuously trading exchanges. The empirical evidence that OTC markets are less competitive than exchanges and that securities dealers find it more profitable to make OTC markets than to be market makers on an exchange is overwhelming.³¹ Indeed, it is well documented that in an “OTC market, different investors may pay quite different prices for the same asset at essentially the same time” (Duffie 2012; Massa and Simonov 2003). Such price dispersion is found, for example, in the U.S. municipal bond market by Green, Hollifield, and Schurhoff (2007) who conclude that “a natural explanation” for this finding is that traders bring different information to their negotiations with dealers. Similarly, Menkhoff et al. (2013)’s study of the foreign exchange market demonstrates that the information flows from non-anonymous customer orders in this vast market create significant profit opportunities for a large dealer.

Overall, empirical evidence strongly supports the conclusion that the interests of the public are more likely to be served by financial markets where securities trade continuously on an exchange, whereas the

³¹ Duffie (2012) observes: “Dealers have a vested interest in maintaining trade in OTC markets, where the profitability of intermediation is enhanced by market opaqueness.” and Dudley (2010) states: “OTC derivatives dealers have natural incentives to favor opaque, decentralized markets that preserve their information advantage relative to other participants. The greater profit margins that derive from this advantage create incentives to favor more bespoke OTC derivatives over more standardized OTC instruments.”

interests of the dealers are likely to be served by financial markets where most trading takes place OTC.³² Because non-transparent markets are more profitable for dealers to trade on than exchanges, one would predict that a financial system that is dominated by a small group of dealers is likely to evolve towards an OTC-dominated structure as the dealers find ways to promote the market structure that they prefer. We have already seen that the evidence in the German case, where OTC markets grew even as the stock market stagnated, supports this hypothesis. We find below that the hypothesis is also consistent with the experience of the U.S. and the U.K. after they allowed universal banking to develop.

B. Case: The Growth of “Dark” Markets in Swaps

From the late 1980s, a market in financial contracts called swaps was also growing along with universal banking. Swaps all fall within the broad category of derivatives, as the value of a swap “derives” from the value of another financial contract, such as a stock or a bond. Because early on the most important forms of swap contracts were interest rate swaps and foreign currency swaps, and these swap contracts derive their prices from Treasury obligations and currencies respectively, commercial banks were allowed to trade them, and indeed were from the very beginning some of the most important participants in the swaps market.

Interest rate swaps allow one party to the contract to pay a fixed interest rate – based on a Treasury – and receive a short term floating market interest rate on a periodic basis, while the other party receives fixed and pays floating. As a rule, at the date that a swap is issued its terms are designed so that expected value of both parties’ payment streams is the same and the market value of the swap is \$0. Over time interest rates move and the value of the swap will typically turn positive for one party and negative for the other. This structure means that the market value of an interest rate swap is a tiny fraction of the value of the Treasury contracts on which the swap is based. The latter value, called the notional value, does not fluctuate and is easier to tabulate; for this reason, the size of the market is often measured by its notional

³² Note that the informational advantage inherent in OTC markets may not be the only reason they are more profitable environments for dealers. Arguably the absence of regulation on these markets is an independent source of lower costs and higher profits – though, of course, in order for lower costs to feed into higher profits there would have to be barriers to competition, such as those that this paper argues are created by the lack of effective regulation, so this may not be an “independent” source of profits at all. Another possibility is that the profitability of OTC markets to dealers may derive from a self-fulfilling prophesy that causes more transactions to be diverted to these markets.

value, not its market value.³³ In a currency swap one party makes periodic payments in one currency and the other party makes periodic payments in a different currency.

The swaps market started small and it was based on contracts without uniform terms, so in its early days it was very illiquid and only suited for trading on OTC markets. The market however grew quickly in the 1980s, because interest rate swaps became one of the primary methods by which commercial banks managed the interest rate risk that the banking crisis of the 1980s brought into focus. At the end of 1986, swap contracts on \$313 billion in Treasuries and currencies were outstanding (American Bankruptcy Institute Survey 1988). By 1990 the notional value of contracts outstanding had reached \$3.4 trillion (ISDA 2010).

Swaps did not fall clearly within any of the existing categories of financial contracts. They were apparently exempt as Treasury-based or currency-based contracts from the Commodities Futures Trading Commission's (CFTC's) jurisdiction over contracts for future delivery. Furthermore, the definition of a security is extremely broad, but sufficiently ambiguous, that it was neither clear that these swaps should be considered securities and subject to the jurisdiction of the Securities and Exchange Commission (SEC), nor that they were not securities. For the most part, however, regulators apparently viewed the utility of these swaps as sufficiently great, that for many years they simply allowed swaps to fall within a legal grey area.

The indefinite status of swaps is important, because the industry quickly realized that some of the privileges granted to regulated securities and regulated futures contracts were very desirable. In particular, in order to facilitate the clearing of contracts that were either exchange-traded or otherwise subject to regulation through a self-regulatory organization supervised by the SEC, such regulated contracts were exempt from several provisions of the Bankruptcy Code. There is little doubt that the industry could have formed a national self-regulatory organization for swaps, sought for the contracts to be treated as securities, registered the self-regulatory organization with the SEC, and, thereby, gained access to the existing protections for securities contracts under the Bankruptcy Code.

³³ One cannot help but wonder whether this norm is also a reflection of the fact that these products have traded for so many years on dark over-the-counter markets, so valuation was more difficult because prices were not public and the contracts were somewhat illiquid. Since February 2014 most of these swaps have been trading on central clearing platforms, so this reason for the use of notional value may be disappearing.

The swaps dealing banks chose a very different path.³⁴ In 1985 the International Swaps Dealers Association (later changed to the International Swaps and Derivatives Association) (ISDA) was formed by the ten largest swaps dealers, who accounted for approximately 80% of the market at the time.³⁵ One bank, Kleinwort Benson, was British, the rest were American. Six of the U.S. banks were investment banks, First Boston, Goldman Sachs, Merrill Lynch, Morgan Stanley, Salomon Brothers, and Shearson Lehman Brothers, and three were commercial banks, Citicorp, Morgan Guaranty Trust, and Bankers Trust. (These commercial banks were the first, fourth, and seventh largest banks in the country respectively in December 1985.³⁶) As described at its founding, the purpose of the organization was to standardize documentation and practices and to serve as a forum to “explore the accounting and regulatory implications” of the swaps (Forde 1985). In short, the organization served many of the same functions as that of a self-regulatory organization, except that it was an international organization and, initially, restricted its membership to the largest dealers.

That the ISDA was effectively a self-regulatory organization, comparable to, for example, the National Association of Securities Dealers, is confirmed by Sean Flanagan, who interviewed for his note several of the ISDA’s principals including almost all the individuals who served as the organization’s executive director from the time of its founding. He writes: “ISDA has played a key role in keeping the OTC derivatives industry self-regulated. It has coordinated industry opposition to CFTC and SEC regulation, acting both as an advocate for the industry and as an instrument for its self-regulation. ISDA has also lobbied successfully to get legislation passed in the U.S. . . .” (Flanagan 2001). This indicates not only that one objective of the ISDA was to keep swaps unregulated, but also that lobbying for legislation and regulatory decisions that were favorable to its members was another important goal. In fact, as early as 1988 the ISDA was representing to Congress that one of its core purposes was “the representation of the common interests of its members before legislative and administrative bodies” (American Bankruptcy Institute Survey 1988).

In short, there is good reason to believe that from the beginning the objective of the organization was not to bring swaps under the regulatory umbrella, but to keep them outside regulated markets. A likely motivation for this objective is the profitability to dealers of trading financial contracts on an OTC basis,

³⁴ I first made this argument in Sissoko (2010).

³⁵ Frank Partnoy argues persuasively that the ISDA was initially formed to lobby the Financial Accounting Standards Board to permit off-balance sheet treatment of the swaps (Partnoy 2003).

³⁶ Call report data, *available at*

http://www.chicagofed.org/webpages/banking/financial_institution_reports/commercial_bank_data.cfm.

as was discussed above. One of the first tasks on the ISDA’s agenda was to get legislation passed that would give swaps the privileges accorded to regulated financial contracts, while at the same time avoiding most of the burdens of regulation – and the presumption that large markets in standardized financial contracts should be exchange-traded.

In 1990, five years after the founding of the ISDA, the legal foundations for the unregulated OTC derivatives market were laid, when swaps, despite their unregulated status, were granted the same privileges in bankruptcy as regulated securities and regulated futures contracts. This legislation effectively legitimized an OTC market in unregulated financial instruments.³⁷ The commercial bank members of the ISDA actively supported this amendment (American Bankruptcy Institute Survey 1988). The ISDA played a significant role in the passage of the legislation and was described at the time as having “requested and supported” it.³⁸

Over subsequent decades, the ISDA worked to turn swaps into a genuine market with standardized agreements and market-like pricing. The fact that it remained for decades an OTC market meant, however, that the dealer banks retained ownership of market data including market prices. Only with the enactment and implementation of the Dodd-Frank Act have the swaps been forced onto clearing platforms eroding the informational advantage of the dealer banks.

At the same time that it built the market for interest rate and currency swaps, the ISDA worked actively to expand the scope of the OTC swaps markets, and to ensure that this expanded market would also remain unregulated. In the early years of the 21st century, after regulatory and legislative actions that severely constrained the ability of regulators to study and supervise the market in OTC swaps, the market for bond- and equity-based swaps grew quickly. These instruments allow traders to simulate the returns of securities that are regulated, while at the same time avoiding any obligations that regulation would impose

³⁷ The swaps market should be distinguished from repurchase agreements and bank-based financial instruments. The key difference is that the ISDA sought to, and succeeded in, turning swaps into a market-traded instrument. One traditional reason why repurchase agreements and bank-based financial instruments receive different treatment from exchange-traded instruments is that they are usually bi-lateral agreements, and not suited to market trading or market-based regulation.

³⁸ The ISDA describes itself as having “actively participated in the enactment of the 1990 amendments to the Bankruptcy Code.” ISDA Amicus Brief, *BNY Corp. Trustee Services Ltd. v. Lehman Bros. Specialty Financing*, No. M 47 (CM), (In re. Lehman) Nov. 1, 2010 (SDNY Bankr.) at 4; ISDA Amicus Brief, *Swedbank, AB v. Lehman Bros. Holding Inc.*, No. 10-cv-04532 (NRB), (In re Lehman) July 14, 2010 (SDNY) at 3.

on the owner of the security. These instruments, too, have only since the financial crisis been subject to regulation.

Large dealers on OTC markets, because their position gives them a privileged view of market data, are able to reap profits from their information advantage, as was discussed above. The OTC derivatives markets are no exception (Dudley 2010). Such profits may have the effect of entrenching the dealers' position in the market by making entry of a new competitor very difficult.

If in fact the ability to trade on “dark” OTC markets did give the founding members of the ISDA an information-based anti-competitive advantage, then we would expect that the same firms that were dominant in 1985 would still be the biggest players in derivatives markets in 2014. This is, in fact, the case. In the United States about 95% of the derivatives held by bank holding companies are accounted for by just five bank holding companies (OCC 2014). These holding companies are, in order: JPMorgan Chase & Co., Citigroup Inc., Goldman Sachs Group Inc., Bank of America Corporation, and Morgan Stanley.

Remarkably, aside from those founding ISDA members that were taken over by foreign banks and therefore do not report to U.S. regulators and one bank that failed, the list of founding ISDA members and list of current major players in derivatives are the same:³⁹ JPMorgan Chase & Co is Morgan Guaranty Trust with a few commercial banks added on over the years; Citigroup is a conglomerate that includes Citicorp, Salomon Bros., and the Shearson part of Shearson Lehman; Goldman Sachs incorporated, but is otherwise the same firm; Bank of America purchased Merrill Lynch; and the last is Morgan Stanley. In short, over the course of thirty years the only changes that have taken place in the identities of dealers on the OTC derivatives market in the U.S. are, first, that a couple of firms have moved abroad and, second, that seven firms have been reduced to five.

By the time the ISDA was founded there was already a strong movement towards universal banking in U.K. and U.S. markets. At the end of 1984, the outlines of Britain's Big Bang were already drawn and only the details were left to be worked out (McMahon 1985). The debate over the Glass-Steagall Act had already been engaged in the U.S., and the commercial banks undoubtedly had strong hopes that it was just

³⁹ Kleinwort Benson was bought by Dresdner Bank, First Boston by Credit Suisse, and Bankers Trust by Deutsche Bank. Lehman Brothers was spun off of Shearson Lehman in 1994, before Shearson merged with Citigroup as part of Travelers. See also Partnoy (2003).

a matter of time before the same forces that revolutionized the British financial system would be successful here.⁴⁰ By December 1986, the Federal Reserve had already taken a very large first step towards universal banking when it interpreted the Glass-Steagall Act to permit limited securities activities by commercial bank affiliates. This first step was almost immediately followed by a relaxation of the limitations on securities activities. As was discussed in Section II, by the time the separation between commercial and investment banks was formally repealed in the U.S. in 1999, it had already been effectively eliminated by regulatory action. In short, by the time the ISDA had started lobbying aggressively to extend the privileges that were granted to regulated financial contracts to OTC swaps in the late 1980s, the U.S. had already set out on the path to universal banking.

Thus, the growth of universal banking in the U.S. was accompanied by aggressive lobbying by the nascent universal banks and the ISDA for formal recognition of an unregulated market in an important financial instrument. The fact that these commercial banks with universal aspirations used their political influence to lay the foundations for an extremely important “dark” financial market may be understood as a natural consequence of universal banking. While it is true that numerically the commercial banks were a minority of the ISDA’s founding members, it’s hard to imagine that a group of investment banks seeking to foster dark markets would have met with the same success before Congress and the regulators that the unified front of this commercial-investment banking nexus was able to achieve.

IV. CONSEQUENCE 2:

PRICE DISTORTIONS THAT MAY HAVE ECONOMY-WIDE EFFECTS

Prior to the admission of corporations to stock exchange membership, both English and American stock exchange members were able to predict correctly that commercial banks would dominate securities markets as soon as they were permitted to deal on them.⁴¹ They were able to make this prediction because they were well aware of the advantage that large size gives a dealer. Here, we discuss the costs and benefits of size on financial markets, followed by the presentation of two specific cases where large banks made very large errors with adverse effects on markets.

A. Hypothesis: Universal Banks Make Large, Potentially Systemic, Errors

⁴⁰ Frank Partnoy observes that one commercial banker was quoted in a newspaper article in 1982 saying: “We’re hoping to see some break in Glass-Steagall” (Partnoy 2003).

⁴¹ Indeed, David L. Ratner, a Cornell law professor, made the same prediction at a 1978 conference discussing the repeal of the Glass Steagall Act (Ratner 1979).

In the early years of corporate membership on stock exchanges, commercial banks were larger than the existing broker-dealers, because the banks were well-established corporations. The commercial banks were large, not just in terms of capital, but also in terms of assets. Their low-cost deposit-based funding was another advantage. These characteristics meant that it was easier for commercial banks to provide liquidity by dealing on markets than for others to do so.

First, the commercial banks' access to cheap funding in the form of low-cost deposits gave them a significant advantage. Because dealers typically borrow to finance their inventories, a commercial bank-dealer will be able to make more in profits on every financed position than a dealer who must pay more to borrow (Mehle 1975). While in theory these profits will be eliminated by competition between commercial bank-dealers, the theory also indicates that this competition will force the stand-alone dealers whose costs are too high to exit the market.⁴²

More importantly, however, there are, in general, limits to the ability of a market making dealer to provide liquidity by carrying inventory (Harris 2003; Easley et al. 2010. See also Schleifer & Vishny 1997). For example, a small dealer that takes a very large position in a single stock may risk failure if the stock suddenly falls in value due to an extreme adverse event. Thus a market making dealer's capitalization functions as a limit on the dealer's ability to bear risk and to make markets. If the size of orders on the market grows to exceed the capacity of most market making dealers to bear risk, it will be a common event that an order cannot be executed immediately with the result that prices become more volatile, due to the increase in the demand for liquidity.⁴³

The advantage of market making dealers with large capitalization is, then, that they will generally have an easier time executing large orders than small firms, because large trades are smaller relative to their resources. Furthermore, to the degree that the trades arriving on the market are of a size that requires the large dealers' ability to execute trades, large market making dealers will do a better job of providing liquidity to the market than small ones (Sobel 1975, pp. 372-73).

⁴² Indeed the entry of commercial banks into investment banking almost certainly transformed the business and this transformation coincides with the growing power of proprietary traders within the investment banks' internal hierarchies.

⁴³ This problem was particularly evident on the NYSE in the 1960s when the market was just adjusting to the growing size of institutional orders. Market makers on the Exchange who were equipped to handle smaller individual orders had difficulty maintaining price continuity and actually ended up turning to the over the counter markets, where trades were not publicized, in order to lay off the risk of the shares (Macey & Kanda 1990; Sobel 1975).

The benefits of the liquidity that can be provided by large universal bank market makers are offset by two sources of significant costs. First, as was discussed above OTC markets provide opportunities for dealers to profit from their information advantage, and any tendency towards concentration in such a market will benefit the large dealers who remain since they will see a greater fraction of the market's order flows (see Menkhoff et al. 2013). Thus, the interplay between size and non-public information flows on OTC markets will tend to increase dealers' opportunities to earn supra-competitive profits based on an information advantage. Thus, when universal banking is combined with significant trade on OTC markets, an oligopolistic market structure is very likely to be the result.

More importantly, however, when extremely large dealers err, those errors may have market-wide or even systemic effects. While price continuity is desirable, stock market pricing should also be responsive to the flow of information in the form of buy and sell orders. A single market making dealer with virtually unlimited resources has the capacity to become the market – by effectively acting as a central bank defending an exchange rate peg. Even when the mispricing is clear to smaller market participants, because they have less capital they may be too small to trade in a large enough size to arbitrage away the large dealer's pricing errors. Thus, when market makers have vast capital resources, the market price can be affected by the – possibly erroneous – views of a single dealer. The London Whale, discussed in section IV.B below, is a clear example of this phenomenon.

In addition, large market makers often have the capacity to hold onto a losing position in hope that the market comes back, and when they misjudge a market that never comes back, the losses and the price shifts that take place when those losses are finally realized may occur on a scale that is not possible for smaller dealers that would have failed much earlier in the trade. Indeed, both of the examples below involve multi-billion dollar losses. Thus, when a huge dealer errs, the error is likely be much more disruptive to markets than a similar error by a small dealer. The costs of such errors may be magnified when systemically important financial institutions experience these dramatic losses.

Capital markets need to be robust enough not to be destabilized by the poor judgment of any single participant, because it is certain that such errors of judgment will occur with some frequency. The traditional means employed in U.K. and U.S. capital markets to guarantee this robustness was for the

market to be populated by relatively small participants that were bankrupted quickly by their errors.⁴⁴ A problem with modern markets is that capital market participants have become such mammoths that they can – and do – carry losing trades until their losses are of a size that can harm the mammoth. Even when such losses do not bankrupt the universal bank, both the building and the unwinding of the trades causes significant disruption to markets and to market prices.

B. Case 1: The “London Whale”

The story of the London Whale demonstrates unequivocally how a universal bank can distort prices in financial markets. J.P. Morgan Chase Bank was the London Whale and, by making purchases of an index contract, the CDX.NA.IG.9, a basket of swaps protecting against default on investment grade corporations, on the basis of a faulty model over a period of several months the bank effectively acted as a central bank defending an – inaccurate – peg. This resulted in losses in excess of \$6 billion.

Charts 1 and 2 depict the volume and price effect of the “London whale.” In Chart 1, we see the volume outstanding of generations 9 through 18 of the CDX.NA.IG contract and their total volume on the right axis. In general, investors prefer the most current generation of the contract, and in this chart the “roll” from generation 10, to 11, to 12, etc. is visible.

[Insert Chart 1 here.]

Clearly, however, the CDX.NA.IG.9 was trading differently from the other generations of the contract. Starting towards the end of 2011, we see the effect of the London whale on the volume of the CDX.NA.IG.9. By April 2012, the volume of this contract outstanding had increased by more than 75%. The price effect of this activity is equally visible in Chart 2 where the price falls fairly steadily from December through March. Given that related markets did not have similar dramatic price movements, it doesn’t take a financial sophisticate to see that there was an arbitrage opportunity here.

[Insert Chart 2 here.]

⁴⁴ While I do not attempt to demonstrate here that universal banks are the only entities that can have this effect on prices, I note that the principal example of a hedge fund that risked destabilizing asset markets, Long Term Capital Management (“LTCM”), actually supports rather than contradicts my thesis that universal bank errors can distort capital markets. LTCM was able to grow so large that it had systemic implications, only due to funding from systemically important universal banks – who were not managing their risks with care. We know this because only one-third of the fund that bailed out LTCM came from U.S. investment banks, the rest came from universal banks (Lowenstein 2000, p. 207).

Indeed, hedge funds had observed unusual price action in the contract and attempted to arbitrage it (Zuckerman & Burne 2012). They were too small relative to the bank, however, to successfully arbitrage the price differential (Ruhle et al. 2012; Mollenkamp and Podkul 2012). Thus, the term, the “London whale,” is an expression of these arbitrageurs’ frustration with their inability to affect a price that was obviously inefficient.

Jamie Dimon, the bank’s CEO, would later describe the bank’s huge position in the contract as an “egregious” mistake (Levine 2012; Kopecki & Abelson 2012). J.P. Morgan Chase’s report on the incident discloses a variety of modeling errors, including, for example, dividing by the sum rather than the average of two figures (JPMorgan Chase 2013). In short, human error resulted in underestimation of the risk of the trade.⁴⁵ The trade and the growing losses on it were not, however, brought to the attention of J.P. Morgan’s senior management until the day before news articles discussing it were to be published (JPMorgan Chase 2013). While J.P. Morgan Chase was large enough to survive these multi-billion dollar losses, this is an example of how the error of an extremely large bank can be allowed to fester until it becomes large enough to adversely affect the financial results of the universal bank. Because a smaller bank would be bankrupted by such losses much earlier, it is clear that a smaller bank does not have the same capacity to distort prices as a bank the size of J.P. Morgan Chase. As a result of J.P. Morgan Chase’s capacity to bear losses, prices were distorted on this market for months, affecting everyone who traded in or held the contract during the time period in question.

C. Case 2: Universal Bank Errors Extended the Subprime Mortgage Boom into 2007

A similar price distortion in contracts protecting against default in the mortgage market played a role in the 2007-08 crisis. Three universal banks, Citibank, Merrill Lynch, and UBS, all took on subprime mortgage exposure in the form of the safest or “super senior” tranches of collateralized debt obligations (CDOs). Before explaining the implications of this particular form of subprime mortgage exposure, the reasons for including Merrill Lynch as a universal bank must be explained. Merrill was the U.S.-based investment bank that took most aggressive advantage of the opportunity to enter commercial banking that the law repealing the Glass Steagall Act offered to financial holding companies. At the end of 1998

⁴⁵ A Senate report describes this incident acerbically: “a critical risk model for a portfolio containing hundreds of billions of dollars of financial instruments, operated by the man who developed the model at the behest of the portfolio manager, included flawed and untested components, and depended upon manual uploads of key trading data daily for its calculations. This untested, unautomated, error prone VaR model was nevertheless put into place at a bank renowned for its risk management” (Senate Whale Trades Report 2013).

Merrill, like other investment banks owned a small FDIC-insured commercial bank with less than \$1 billion in assets. Three years later Merrill Lynch Bank USA had \$65 billion in assets and was the 15th largest bank in the U.S. Merrill Lynch Bank USA would continue to be one of the 25 largest banks in the U.S. up until its purchase by Bank of America.⁴⁶ Given these facts Merrill Lynch should clearly be classified among the universal banks.

To understand how these banks were able to distort prices in the mortgage market, the structure of CDOs must be explained. CDOs package a large number of debts together and then create a capital structure for the package by selling a first-loss tranche, called equity, several different tiers of subordinated claims which purport to make fixed payments over time, and a very large last-loss tier that also promises to make fixed payments and is protected from loss by all the subordinated claims. This last-loss tier is the “super senior” tranche. The term “super senior” was meant to indicate that these tranches lay so high up in the capital structure of the CDO that they were safer than AAA debt.⁴⁷

However, because the particular CDOs to which Citibank, Merrill Lynch, and UBS were exposed packaged together debt that was itself subordinated tranches of other securitized assets, any chart of the full range of the super senior CDOs’ potential payoffs would show that these assets had “cliff risk.” In other words, they would perform very well under many scenarios, but when the level of defaults passed a certain threshold their value would drop relatively quickly to zero (Nomura 2005). The underlying assets were mostly mortgage related, and none of these banks “was very concerned about housing market risks”. Thus, all three banks assumed that there was almost no probability that the cliff would be reached, which implied that the returns paid by taking on this exposure would result in a certain gain. Each bank ended up with more than \$50 billion of such CDO exposure (FCIC 2011; UBS 2008).

Because these big banks were willing to take on so much exposure to subprime mortgages in the form of super senior CDOs, they made the formation of the CDOs to which they were exposed possible and almost certainly affected the price of the underlying securitizations as well. Furthermore, both the CDOs and the underlying securitizations were not composed entirely of actual assets, but in part of swaps that promised the same payments as specific assets. In these swaps one party, the protection buyer, made a

⁴⁶ Data available at <https://www5.fdic.gov/sdi/main.asp>. Merrill Lynch Bank USA’s FDIC Certificate number was 27374.

⁴⁷ Marketing materials in fact sometimes referred to them as AAAA securities (Mathern 2003).

periodic payment (simulating interest) in exchange for the other party, the protection seller, making a lump sum payment in the event that the referenced asset went into default (simulating a loss of principal).

As a result of this structure, the willingness of the big banks to take on massive exposure to subprime mortgages didn't just make the formation of CDOs and securitizations possible, it also made available a supply of protection against a fall in value of subprime mortgages and related assets. This supply of protection kept the costs of buying such protection from rising too much, even as demand for it was increasing due to growing skepticism about the health of the subprime mortgage market.

Overall, Citibank, Merrill Lynch, and UBS erred, believing that the super senior tranches of CDOs were underpriced and that selling this protection against subprime mortgage defaults was an arbitrage opportunity. Because these banks were so big, they were able to take on a vast amount of exposure to subprime default risk. Thus, the errors of these three banks kept the price of buying protection against subprime defaults from rising quickly in late 2006 and 2007 as the demand for protection increased and more and more traders sought to take a short position on the performance of subprime mortgages. The market influence of these banks may explain the fact that up through July 2007 indices measuring this price indicated that there was virtually no risk in the AAA tranches of subprime mortgage securitizations and little risk in the lower rated tranches – after this date the price gapped out dramatically (Fender & Scheicher 2009). By interfering with price signals at a turning point in the housing market, the errors of the universal banks tended to extend the housing boom and worsen the crash.

These errors in judgment distorted the price of subprime mortgage risk in a way that would not have been possible for smaller firms that could not possibly carry \$50 billion of exposure to anything. Subprime mortgage defaults did, in fact, exceed all expectations, and as a result these CDOs performed extremely poorly, forcing each bank to take at least \$12 – 14 billion in losses (UBS 2008; FCIC 2011; Keoun et al. 2010). Thus, not only the price distortion, but also the losses resulting from the distortion played a role in the systemic crisis of 2007 and 2008.

Overall we see that when big banks err, they may allow their mistakes to grow into big mistakes before addressing them. While these big mistakes often just affect prices in discrete markets, they sometimes also affect the whole economy. In every case such errors undermine confidence in the markets that are dominated by universal banks. These, too, then are costs of universal banking that must be taken into account.

V. CONSEQUENCE 3: INCREASED RISK OF ASSET PRICE BUBBLES

The Senate Report on the bill that would become the Glass-Steagall Act explained that one purpose of the Act was to strictly circumscribe the role played by commercial banks in the stock market. This section of the paper first lays out the elements of the argument, then discusses the evidence available at the time that supported the view that commercial banks had played a role in the stock market boom and bust of the late-1920s, and finally discusses the relevance of this analysis to the recent financial crisis.

A. Hypothesis: Commercial Bank Margin Lending Creates Asset Price Bubble Risk

The Senate report argued that destabilizing feedback loops can be generated on asset markets when commercial banks lend on margin against assets as collateral. Three key elements play a role in this process: the monetary role of commercial banks, the nature of margin lending, and the fact that borrowing decisions may be affected either by procyclical decision rules or by adverse selection. Each of these elements is discussed in turn.

1. The Role of Banks in the Money Supply

A key component of the argument that commercial bank participation in margin lending distorted financial market prices relies on the understanding that commercial banks are different from other lenders because of the role they play in the money supply. The early 20th century view of the economic function of banks was that their lending made it possible for the money supply to expand and contract with the needs of the economy. The monetary role played by banks in the economy is, however, rarely acknowledged in the modern economics literature.⁴⁸

Although much of the literature on banking erroneously describes commercial banks as intermediating between savers and borrowers, in reality commercial banks do not need to source funds from savers, but can simply expand the money supply (McLeay et al. 2014).⁴⁹ First, as a matter of accounting the act of making a bank loan creates both an asset, the loan itself, and a liability, the funds in the deposit account made available to the borrower, and this increase in deposits is an increase in the money supply. Thus, banks are distinguished from non-bank financial intermediaries by the fact that they do not need savers to provide the funds that they lend out, but can simply increase their deposits outstanding, subject of course to regulatory requirements. While it is true that the borrower is likely to withdraw the proceeds of the loan

⁴⁸ Financial market practitioners, by contrast, rely on a handbook that starts with an acknowledgement of the special role that banks play in creating money (Stigum & Crescenzi 2007).

⁴⁹ Theoretic foundations for this approach are established in an environment with liquidity constraints in Sissoko (2007).

from the bank and spend them, in practice the recipient of the funds will almost certainly redeposit these funds in the system of banks and money market funds, so the effect on the money supply aggregated across these monetary intermediaries remains until the loan is paid off.⁵⁰

Second, Federal Reserve monetary policy has for decades been based on the setting of an interest rate target and in order to meet that target, the Federal Reserve stands ready to expand (and contract) the supply of bank reserves to meet the demands of the banking system. Banks then evaluate each potential borrower with the understanding that they may need to borrow reserves to meet the regulatory requirements of issuing deposits and thus that the interest charged to the borrower must include an appropriate markup over the cost set by the Federal Reserve for borrowing reserves. As long as the Federal Reserve stands ready to meet the banking system's demand for reserves at the policy rate, reserve requirements do not constrain the banking system's ability to expand the money supply.⁵¹

The important conclusion to draw from this discussion is that the banking system's ability to expand the money supply in the form of deposits is not constrained by the savings of the public, but instead by any legal constraints on lending, central bank and regulatory policy, the behavior of borrowers (who may choose to repay loans immediately), and the banks' evaluation of the profitability of lending (McLeay et al. 2014). Overall, commercial banks are distinguished from other lenders, because of the extraordinary ease with which they source their funds and expand the money supply.

2. Commercial Bank Margin Loans are Demand Driven

Margin loans are callable loans that are collateralized by marketable securities. Margin loans are structured to be safe for the lender: overcollateralization on them must be maintained, they can be called at any time, and the lender has the right to sell the collateral if the call is not met. The only situation in which an attentive margin lender loses money is when financial markets are so seriously disrupted that prices fall faster than the lender can sell despite overcollateralization. Many different terms have been

⁵⁰ In modern markets, large sums are held in money market funds instead of banks. Such holdings are counted in the M2 measure of the money supply.

⁵¹ Note, first, that in other monetary policy regimes, banks still expand the money supply, but the mechanism is more complicated. Note, second, that in the post-2008 environment where the banking system is flooded with excess reserves, this traditional mechanism of controlling the money supply through the policy rate may be breaking down. And note, finally, that bank lending may also be constrained by the need to meet capital requirements, but these are always a very small fraction of the value of the loan, and if the bank sells the loan, there will be no capital requirement.

used to refer to margin loans that have the same basic characteristics: in the 1920s these loans were called call money loans or brokers' loans; in modern markets they are repurchase agreements.

Because margin loans are extremely safe assets for lenders, the call money market was the principal market in which bank reserves were invested in the years prior to the formation of the Federal Reserve (Federal Reserve Board 1943, p. 434). Both national banks located throughout the country and state-chartered banks often held their reserves with a New York correspondent, and through the correspondent lent those reserves out on the call money market. After the founding of the Fed, this market not only continued to play an important role, but actually began to displace the secondary market for reserves, the commercial paper market, that the drafters of the Federal Reserve Act had hoped to strengthen.⁵²

Because of the extraordinary safety of margin loans, if legal constraints, central bank policy, and regulatory policy permit commercial banks to provide funding for these loans, then commercial banks will meet borrowers' demand for these loans at a profitable rate of interest – which will include a risk premium only to the degree that the underlying assets are illiquid and overcollateralization is insufficient.

Thus, when commercial banks are permitted to provide funding for margin lending, they will allow this lending to grow to meet borrowers' demands. Because commercial banks expand the money supply when they lend, these extremely safe loans incentivize banks to expand the money supply alongside asset price increases. In effect, the fact that commercial banks do not need to source funds from savers, but can simply expand their liabilities in order to lend, means that a natural constraint on the growth of assets prices, the scarcity of funds, is eliminated when commercial banks are permitted to participate in margin lending markets.

3. The Effects of Procyclicality and Adverse Selection on Margin Loan Demand

⁵² James (1995) finds that the decline in the commercial paper market can be attributed to changes in the banking system in 1924 and interprets this date as a turning point in the growth of large banks in the U.S. This date, however, also captures significant changes in the securities issuing behavior of commercial banks: as Calomiris (1995, p. 270) observes, commercial banks with securities affiliates tended to have large branching networks, because of the complementarity between the two activities.

Another factor, cited by contemporaries, in the decline was the fact that the same borrowers whose credit was of high enough quality to qualify them to issue commercial paper had easy access to securities markets. Note that unlike the British banking system which was founded on the circulation of “two-name paper” (i.e. commercial bills that had at least two guarantees of payment) and had received liquidity support from the Bank of England since the 18th century, the U.S. commercial paper market traded less liquid single-name commercial paper.

Because commercial banks can expand the money supply in order to make margin loans and these loans are extremely safe for the banks, borrower behavior will determine whether the market facilitates the growth of asset prices. The modern literature identifies two situations in which borrowers' decisions may fail to constrain the growth of asset-backed debt: procyclical feedback loops and adverse selection.

That collateralized finance can be destabilizing due to procyclical feedback loops was established by Adrian and Shin (2010).⁵³ When margin borrowers target a specific leverage ratio, as asset prices rise and the leverage ratio falls, these borrowers will purchase more leveraged assets to reduce the leverage ratio to the target. Then, the purchase of additional assets serves to reinforce the tendency for asset prices to rise, creating a feedback loop. This feedback loop also works in reverse: when asset prices fall, they trigger asset sales that tend to push asset prices down further.

Thus, when margin borrowers follow a decision rule that has the effect of targeting a specific leverage ratio, their behavior will tend to create a feedback loop that causes any movement in asset prices to be reinforced by the effect of the price movement on the borrowers' leverage. Adrian and Shin (2010) show that modern investment bank balance sheets exhibit this behavior, possibly due to their reliance on a risk measure called Value-at-Risk. Thus, in certain environments, collateralized finance will be associated with asset price bubbles.

The second phenomenon which can distort asset prices in the presence of commercial bank-funded margin loan markets is adverse selection. The problem of adverse selection in markets for debt is well established. A lender who raises interest rates may find that this action discourages "good" borrowers who decide that borrowing is too expensive, but attracts "bad" borrowers who are less likely to repay the loan (Stiglitz & Weiss 1981).

This has implications for commercial banks engaged in margin lending. If commercial banks are worried about an asset price bubble and therefore are concerned that asset prices may decline very suddenly, they may raise interest rates on margin loans to compensate for the potential illiquidity of the underlying assets. But this creates a classic problem of adverse selection: the increase in rates will cause the borrowers who understand that the rate increase is an indicator of growing instability in asset prices to

⁵³ Adrian and Shin show that investment banks which target a fixed ratio of the risk measure, Value-at-Risk, to equity will generate a procyclical feedback loop, that the data exhibit such procyclical leverage, and that repurchase agreements – or margin loans – are the mechanism through which the adjustment in leverage is achieved.

exit the market, and the remaining borrowers will be risk-takers who are willing to risk bankruptcy or those who are either irrational or confused.

Margin loans are, however, carefully structured to be safe for the lender, so it is far from clear that the lender will find it necessary to raise interest rates; after all, if the loans are sufficiently overcollateralized the lender is protected. Therefore, it is important to observe that an increase in interest rates is not necessary to trigger adverse selection. Brunnermeier and Pedersen (2009) have established that the structure of margin loan markets – and in particular the possibility of forced sales – means that asset prices can collapse, diverging significantly from fundamental value – at the cost of the borrower who was forced to sell. Given the dangers of such a collapse in a margin loan market, borrowers with a sound understanding of the market will exit as the likelihood of an impending asset price collapse increases. Just as in the case of an increase in interest rates, the borrowers remaining in the market will be risk-takers, the irrational, and the confused.

These then are the elements of the argument that when commercial banks make margin loans, they increase the risk of asset price bubbles: because commercial bank lending tends to expand the money supply, margin lending by commercial banks makes it possible for the money supply to increase due to an increase in asset prices, and an asset price bubble will be seen when a feedback loop develops between the money supply and asset prices. The Senate Report on the Glass-Steagall Act makes it clear that this was one of the phenomena the Act was designed to address, as is detailed in the next subsection.

B. Case 1: The U.S. Stock Market in the 1920s

The Senate Report on the Glass-Steagall Act discussed the role that commercial banks can play in an asset price bubble with specific reference to the U.S. stock market in the 1920s. Each of the three elements that was explained in detail above is addressed in the Report.

First, the Senate Report (1933) discusses the monetary role of banks and connects the money supply growth of the late 1920s to the increase in asset prices:

The years after 1925 . . . were years of a very great inflation of bank credit. . . . By inflation, in the sense in which that word is here used, is meant the increase of bank liabilities, usually demand liabilities, in a proportion or degree materially greater than the rate of increase indicated by the requirements of a gradual growth of business transactions involving the production and distribution of goods—in a degree or ratio, therefore, greater than that in which the need for media of exchange had grown. . . .

It is now evident that the increase in deposit credit on the part of the banks already described was largely used in three ways: (1) in the carrying and inflating of the prices of securities, especially common stocks, [(2) on real estate, and (3) on capital equipment investment].”

Second, the Report found that the role played by commercial banks in margin lending had had a distortionary effect on financial markets. Indeed, this view was uncontroversial at the time: both the Federal Reserve Board and the Federal Reserve Bank of New York were convinced that commercial bank finance of call loans had distorted securities prices (Friedman & Schwartz 1963).⁵⁴

The Report focused on the distortionary role played by commercial banks in lending on margin to the public and in intermediating flows from foreign banks and domestic investors into call loans, because Senate and Federal Reserve action taken in 1928 had successfully put an end to growth in the direct commercial bank finance of the call loan market (which financed brokers).⁵⁵ The Senate Report (1933) explains the role of the banks, referring to the intermediated segment of the call loan market as “others”:

Where did the “others” thus spoken of obtain their funds? They obtained them, of course, in substantial measure from the public at large through sales of new issues, which rose steadily through this period. . .

A large portion of the funds obtained by these issues of securities from the public . . . was left over; it was not directly required for immediate use, the issuers of securities having overborrowed or overcapitalized themselves, so that they were in possession of more current funds than they needed. This surplus of funds went into the stock market . . .

The major source of the inflation, however, was the creation of new bank credit through large loans and investments by banks that had substantial surplus reserves, owing to gold imports, open market operations of the reserve banks, etc. . . .

The Report expands on this latter point.

Where did the public which bought the securities of such corporations get the funds they thus supplied? Some portion of the money naturally came from savings and current incomes, but a larger fraction was unquestionably obtained from the banks by means of the security borrowings to which reference has been

⁵⁴ What the Board and the New York Fed did not agree on was how to address the problem.

⁵⁵ In 1928 Senator Glass sought to curtail the growth of the call money market by preventing Federal Reserve member banks from increasing their lending on this market (Brokers’ Loans Hearing 1928). The data indicate that Senator Glass’s remonstrations, as well as jawboning by the Federal Reserve may have had an effect as margin lending by banks themselves never exceeded the December 1927 level.

made at an earlier point. The banks were thus lending directly in unprecedentedly large amounts directly to brokers; but they were also lending in even larger amounts on collateral to the general public, which was then taking the funds so supplied and using them in large degree for the purchase of securities whose proceeds were applied to speculative loans in the market. The flow of funds through the hands of the general public into those of the corporations, and from the latter into the hands of brokers and dealers, who then re-lent the funds to the public engaged in speculation, was thus primarily the result of a loose banking policy which had turned from the making of loans on commercial paper to the making of loans on security.

In short, the Report finds that the commercial banks played a key role in maintaining the flow of funds into securities market by lending on margin to the public and by intermediating call market loans.

Third, the preceding quote also explains how in the view of the authors of the Report the stock market bubble of the late 1920s had been inflated by a feedback loop: the funds raised by issuing securities were often invested in the call loan market, thereby financing additional purchases of securities,⁵⁶ while at the same time bank lending on margin to the public increased with rising prices, creating more funds with which the public could purchase securities. The Senate Report (1933) summarizes this feedback loop and its consequences concisely – using the term “security loans” for loans collateralized by securities:

Stock-exchange speculation in excess . . . was an accompaniment or symptom of unsound credit and banking conditions themselves. The facts as to the expansion of such speculation are well known, and its history requires no repetition but the major data, facts, and conclusions may be briefly summarized as including: (1) A steady increase in bank security loans and investments; (2) rising price resulting from the increased resulting demand; (3) a sporadically enlarging volume of stock-exchange operations and new issues made possible by popular enthusiasm thus engendered; and, finally (4) a violently fluctuating course of prices on the stock exchange continuing until the whole structure fell of its own weight, resulting in the sharp downward movement which began in the autumn of 1929 and has been followed by sporadic collapses at various times since.”

As a result of this analysis, when the Senate Report on the Glass-Steagall bill lays out “specific conditions which stand out as requiring some remedy,” the first such condition is “excessive use of bank credit . . .

⁵⁶ Although there is no firm data on the identity of the “others” in the call money market, and thus no firm data to support this view, there is testimony from the Pecora Commission that supports the Report’s claims (Pecora Report 1934). Note, however, that more recent studies have concluded that corporations were relying more on retained earnings than on new securities issues to invest in margin loans (Smiley & Keehn 1988). Smiley and Keehn report that Standard Oil had an average of \$87 million out on margin loans through September 1929. The fact that much of the growth in the call loan market financed new securities issues – at a time when commercial banks were doubling their market share in underwriting – likely contributed to the view that this activity was part of the problem.

for excessive carrying of securities with borrowed money.” And in addition to the often discussed provisions of the Act that placed a firewall between commercial banking and investment banking, the Glass-Steagall Act prohibits commercial bank intermediation of non-bank access to the call loan market. Section 11 of the Act imposes a daily fine of up to \$100 for every violation on any bank that “acts as the medium or agent of any non-banking corporation, partnership, association, business trust, or individual in making loans on the security of stocks, bonds, and other investment securities to brokers or dealers in stocks, bonds, and other investment securities.”⁵⁷

Because this view presented by the Senate Report of the commercial banks’ role in the stock market bubble is not very familiar to modern readers, it is worth reviewing some of the data that was available when the report was written and that supported the Report. The view that bank margin loans were growing at an unsustainable rate prior to the stock market crash of 1929 is supported by the evidence. From June 1922 to June 1929 the commercial loans of “all incorporated commercial banks” increased by 12%, whereas the loans made by these banks on securities increased by 126%. Furthermore, the increase in loans on securities accounted for 43% of the increase in these banks’ loans and investments (Willis 1932). When the data on lending in the call loan market is evaluated we see – in Chart 3 – that this market was growing exponentially.

In addition to the data on the volume of securities-backed lending, a brief review of the behavior of interest rates in the call money market in 1928 and 1929 is instructive. Chart 4 indicates that, as the growth of bank margin lending came to a standstill, the interest rate that borrowers were willing to pay jumped to exceed the prime commercial paper rate, at first by 1 to 1.5%, but by mid-1929 it was sometimes double the prime rate. This interest rate was being paid on an overcollateralized and callable – or in other words, almost risk free – loan.

As borrowers started to pay more than 12% for a loan that was overcollateralized and callable, the conclusion that adverse selection was playing an important role in the market is hard to avoid. The only borrowers for whom this would make sense are those who are already at serious risk of bankruptcy and “gambling for redemption.” One therefore suspects that by mid-1929 a substantial segment of the borrowers remaining in the market were either enthralled by the euphoria of rising prices, or simply did not understand the nature of the loans they had taken out to purchase securities. One contemporary

⁵⁷ Note that transactions with foreign banks are addressed in Section 10.

commentator explained that the October 1929 financial crash was met in both the domestic and the international community mostly with a sense of relief and an expectation that normalization was around the corner (Daiger 1932).

This interest rate data makes it clear that from the lenders' point of view the exponential growth of these loans was entirely rational. Given the interest rates on offer and the riskless nature of the loans, it is no surprise that corporate and foreign bank funds were pouring into the market (Smiley & Keehn 1988; Fortune 2002).⁵⁸ On the other hand, as soon as the interest rate differential collapsed, this source of funds disappeared from the market – and it is well established that the forced sales characteristic of such a collapse in margin lending played a very important role in the initial stages of the stock market collapse.

In short, the legislators who passed the Glass-Steagall were acting on the basis of substantial data that indicated that interaction between commercial banking and lending on margin against securities had disrupted asset markets. Even so, an important question was not addressed by the Senate's report: If commercial bank lending on margin loans was so pernicious, why hadn't similar problems with the margin loan market been observed in the U.S. in the years prior to the establishment of the Federal Reserve?

I speculate here on some possible responses to this question. First, it is possible that initially the call loan market was not treated by banks as an asset class into which investable funds were allocated, but as an interest-bearing venue for the safe-keeping of reserves. In this scenario, the reserves placed by banks in the call loan market were determined by the commercial activities of the banks, and the bank supply of funds to the market would be relatively unresponsive to changes in call loan borrower demand for funds. As long as borrower demand was fairly stable, so that interest rate changes were generally driven by the banking system's need for liquidity, the banks would face little incentive to change such an approach.

Second, it is possible that the New York Clearinghouse, which effectively supervised the New York banks before 1913, was either sufficiently attuned to the dangers of the call loan market that it enforced

⁵⁸ A telling anecdote about the view of lenders towards the market is to be found in the documents of New York Fed President George Harrison. He tried to dissuade one bank from using Treasuries to borrow from the Fed in order to invest in the call money market. Harrison was told that bank officials felt entitled to the profit on call loans that came from this arbitrage. "They had pursued a policy with respect to government bonds (which meant much less profit to them than if they had invested their funds in call money rather than in government bonds) believing that when the time came, those government bonds would be eligible for their use with a profit which would compensate them for the loss in subscribing for and carrying the bonds; that that time in his opinion had come . . ." Quoted in Friedman & Schwartz 1963).

the approach described above, or that its member banks were sufficiently fearful of falling out of the good graces of the Clearinghouse that they imposed strict conditions on themselves.

Finally, it well established that the new channels of selling securities that developed in the 1920s made stock market investment – including margin accounts – available to the general public. This influx of new and often unsophisticated investors may have been large enough to make it possible for adverse selection to have a market-wide, instead of a smaller localized, effect. In addition, to the degree that in the early decades of the century investment accounts were more likely to belong to high-net worth individuals and companies, the brokers facilitating these accounts may have been more solicitous of the interests of their clients than in later years when brokerage accounts were more broadly available to retail clients. In this scenario, brokers may have encouraged investors to borrow on margin much more in the 1920s than in the earlier decades.

Overall, the Senate Report indicates that the legislators who passed the Glass-Steagall Act concluded that the existing relationship between commercial banking and the stock market in the 1920s and 1930s was dysfunctional, and that they did so on the basis of substantial evidence that commercial bank participation in securities markets had distorted securities market pricing. The Senate Report identifies feedback loops as a source of this distortion, and explains that the call money market of the late 1920s was exhibiting a market failure, even though it could not at the time describe the problem as one of “adverse selection.” As has already been discussed, at the time of the Glass-Steagall Act’s repeal, the fact that it was passed in no small part in order to protect capital markets from the influence of commercial banks had been entirely forgotten.

C. Was the 2007-2008 Crisis a Second Case?

In this section we briefly explore the application to the 2007-08 crisis of the Senate Report’s analysis of the relationship between commercial banks and capital markets, while acknowledging that a full treatment of this question would require a much more thorough analysis than is possible here. First, observe that commercial banks play an important role in the money supply today, just as they did a century ago. Indeed, prior to the recent financial crisis, the Federal Reserve’s monetary policy was implemented by setting an interest rate target. The effect of this policy was to meet the demand of commercial banks for reserve funds given the interest rate – and thus to permit commercial bank lending policies to determine the appropriate size of the money supply, given the policy rate.

While it is easy enough to establish that commercial banks continue to play the monetary role that they did in the past, subsequent to the erosion of the differences between commercial and investment banks

over the past few decades, it is less obvious that commercial banks are distinguished from other financial intermediaries due to the role they play in the monetary system. After discussing the characteristics of modern margin lending markets, this issue will be revisited below.

The second element in the argument that commercial bank margin lending fosters asset price bubbles relates the characteristics of margin lending to the fact that, when commercial banks lend on them, they become demand driven. In modern margin lending markets repurchase agreements (“repos”) play the most important role and, as our hypothesis predicts, prior to the crisis the supply of credit on the repo market expanded to meet the demand for it.

A repo is the combination of the sale of an asset with a simultaneous agreement to purchase the asset back at a specific date and price. As section 11 of the Glass-Steagall Act prohibits commercial banks from acting as the “medium or agent” of a non-bank in making loans collateralized by corporate securities to brokers or dealers precisely in order to prevent the development of a margin lending market that is intermediated by commercial banks and this section is still valid law, it is remarkable that an important segment of the repo market, the tri-party repo market, is intermediated by two commercial banks, J.P. Morgan Chase and Bank of New York Mellon. Presumably the fact that margin lending on this market takes the form of sales and repurchases allows a bank to make a colorable argument that a repo is not collateralized lending. By the start of the 21st millennium the repo market had become an important part of the money market, and indeed Adrian and Shin (2010) have shown that prior to the crisis repos were the mechanism through which the broker-dealers adjusted the degree to which they were leveraged.

Just as in the 1920s repos are designed to protect the lender from risk of loss. They are usually over-collateralized, they are re-margined daily, and at the time of the crisis the lender had the right to sell the collateral if the borrower failed to meet a margin call – even if the failure was due to the borrower’s bankruptcy. (Note that the 1990 swaps amendment that was so important to the ISDA and is discussed above, made it possible for the collateral posted against a liability due on a swaps contract to be treated the same way as repo collateral.) Repos are very safe assets for the lenders, but – as the Bear Stearns and Lehman Bros. failures demonstrate – they can be catastrophic for the borrower.

Because repos are so safe for lenders, it has for decades been easy to finance holdings of assets that are liquid and trade regularly, such as government bonds, using repos. In the years preceding the crisis, however, the finance on the repo market of highly rated structured assets that were relatively illiquid and

rarely traded, such as collateralized mortgage obligations, became common.⁵⁹ Indeed, it became easy enough to finance these and other asset backed securities on the repo market that dealer banks relied on this form of finance in their process of originating structured finance products such as collateralized debt obligations (Poszar et al. 2010). The fact that an important source of revenue for the dealer banks relied on their ability to repeatedly renew repo loans, is an indicator that, prior to the crisis, the supply of credit was expanding to meet the demand – and was expected to continue to do so.

The final element in the argument that commercial bank margin lending fosters asset price bubbles is that in an environment where commercial banks support margin lending, either procyclicality of borrower behavior or adverse selection of borrowers makes it possible for collateral-financed loans to grow along with asset prices generating an adverse feedback loop and price instability. Adrian and Shin (2010) have established that there was a problem of procyclicality in modern financial markets prior to the crisis and that this data is likely the result of risk management policies put in place by dealer banks which had the effect of targeting a specific leverage ratio. They find that when this procyclical behavior is combined with collateralized lending, the effect is to promote asset price booms and busts. Indeed they find that the process of securitizing assets itself can be viewed as a prolonged bubble (Adrian and Shin 2009).

Because margin lending is structured to favor the lender, the mystery in this crisis – as was the case in the late 1920s – is why the borrowers were willing to enter into loans with such stringent terms. We are left with the same basic explanation: adverse selection. The repo market prior to the crisis was most likely selecting out those who may be hiding insolvency and gambling for redemption, those who simply fail to understand the terms on which they are borrowing,⁶⁰ or those who suffer from excessive optimism and a belief that asset prices will not fall far. The latter category may be particularly large in modern markets, on the basis that, if asset prices start to fall, they will trigger a systemic event, and the Federal Reserve

⁵⁹ Equities became an important form of repo collateral in 2007 when it became more difficult to finance many structured finance products on repo markets. ICMA (2007) reports that equities comprised 21% of the collateral posted in the European tri-party repo market in June 2007, and an indicator that the data for the U.S. tri-party repo market was similar is the fact that at the peak of the crisis more than 40% of the collateral posted at the Federal Reserve’s Primary Dealer Credit Facility was equities (with the Fed taking only an 8% haircut on the aggregate of the collateral!). Data available at http://www.federalreserve.gov/newsevents/reform_pdcf.htm

⁶⁰ The collateral crisis experienced by AIG may reflect this, as AIG apparently did not evaluate the collateral terms of its super senior exposure when it measured the risk of the positions it entered (O’Harrow & Dennis 2008).

will either step in to keep asset prices from falling or take other action to protect financial institution borrowers from systemic risk.⁶¹

In short, the analysis of the relationship between commercial banks and capital markets that was presented in the Senate Report on the Glass-Steagall Act can be used to explain the role of the repo market in the 2007-08 crisis. One objection to this claim remains to be addressed: many have argued that in modern markets non-banks play the same role in the monetary system as commercial banks (see, e.g., Mehrling et al. 2013), and therefore the basic premise of the Senate Report's approach is misguided. It is far from clear, however, that the premise of this objection is correct: in fact, when non-banks play a role in the money supply they are almost always relying on the existence of an underlying commercial bank guarantee.

To be more precise, when non-banks play a monetary role they rely on one of two instruments, commercial paper or repurchase agreements, and there is every reason to believe that the monetary character of both of these instruments derives from commercial bank guarantees. With few exceptions (most of which disappeared in the crisis) commercial paper is an investable asset because it is protected by the liquidity support of a commercial bank. Thus, when asset backed commercial paper conduits or money market funds that invest in commercial paper are framed as bank "competitors," this is inaccurate. The liquidity of commercial paper derives from the liquidity facility provided by the commercial banks, and commercial paper would not receive a high enough rating to serve as a near-money instrument in the absence of these guarantees (Stigum & Crescenzi 2007; Moody's 2003; Fitch 2001).

Repos are also protected by commercial bank guarantees, but in this case the guarantees take a different form. At the core of the modern repo market lies the tri-party repo market and at the core of the tri-party repo market sit the two tri-party clearing banks. As the name of the market implies, each of these clearing banks serves as a third party which holds, values, and manages collateral for non-bank lenders that lack

⁶¹ The stated policy of the Federal Reserve under Greenspan was to protect the market from systemic risk: Greenspan (1998) states: "The management of systemic risk is properly the job of the central banks. Individual banks should not be required to hold capital against the possibility of overall financial breakdown. Indeed, central banks, by their existence, appropriately offer a form of catastrophe insurance to banks against such events." See also ICMA (2012) averring: "The question is how to mitigate such systemic liquidity risk [from a fire sale of collateral assets]. We believe that systemic risks require systemic responses. In this case, the authorities can be expected to intervene as lenders of last resort to ensure the liquidity of the system as a whole. For their part, market users should be expected to remain creditworthy and to have liquidity buffers sufficient to sustain themselves until official intervention restores sufficient liquidity to obviate the need for fire sales."

the capacity to do so themselves. Since the early days of the market, however, this has not been the Morgan bank's only role in the market. JPMorgan Chase has for decades made markets in repo, and this has meant that when it valued repo collateral as a clearing bank, tri-party repo participants could be confident that there was a venue where this value could be realized.⁶² In short, commercial banks have provided a liquidity guarantee to the repurchase agreement market, just as in the commercial paper market. In the case of the repo market, however, the guarantee took the form prior to the crisis of at least one commercial bank that stands ready to offer a repo of eligible collateral at a market price.

Fortunately, regulators have taken many steps subsequent to the crisis to control the destabilizing forces unleashed by the repo market, including reform of the tri-party repo market to reduce the role of the clearing banks and a variety of new regulatory requirements that raise the cost to commercial banks of lending in the repo market. These policies have forced commercial banks to pull back on providing liquidity to the repo market and caused it to shrink (Fleming & Alloway 2014; Burne 2015; ICMA 2015). These changes have drawn accusations from the financial industry that “regulators do not fully appreciate how the repo market operates” (ICMA 2015, p. 4). This section of the paper indicates that regulators run far more risk of doing too little, than of doing too much to constrain the repo market – as long as commercial banks continue to be important participants in the market.

VI. CONCLUSION

This paper has detailed three important ways in which the growth of universal banks has adversely affected capital markets. Post-crisis regulatory changes have in some measure addressed each of these problems as regulation has been extended to OTC derivatives, banks have been subjected to much closer supervision of their risk management, and regulation has increased the costs of commercial bank participation in the repo market.

This paper does not take a position on the best means of dealing with the problem of universal banking in the modern financial system. In particular, I do not argue here that legislative reform is necessary, but entertain the possibility that a strict regulatory regime may be sufficient to address the problems created

⁶² A large portion of JPMorgan's repo dealing takes place on the balance sheet of the FDIC insured bank. JP Morgan Chase Bank, N.A. funded more than 5% of its total balance sheet in the repurchase agreement market in both December 2007 and December 2013. And the bank is an even more important lender in the repo market, as (reverse) repos comprised 17% of its assets in 2007 and 12% in 2013. FFIEC data, available at <https://cdr.ffiec.gov/public/ManageFacsimiles.aspx>.

by universal banks. On the other hand, only regulators who understand the dangers created by the presence of universal banks in the financial system will be able to implement and maintain a regulatory system that keeps these dangers under control. Thus, the goal of this paper is to set forth an intellectual framework explaining the costs of universal banking in order to aid regulators in the design of an effective regulatory regime.

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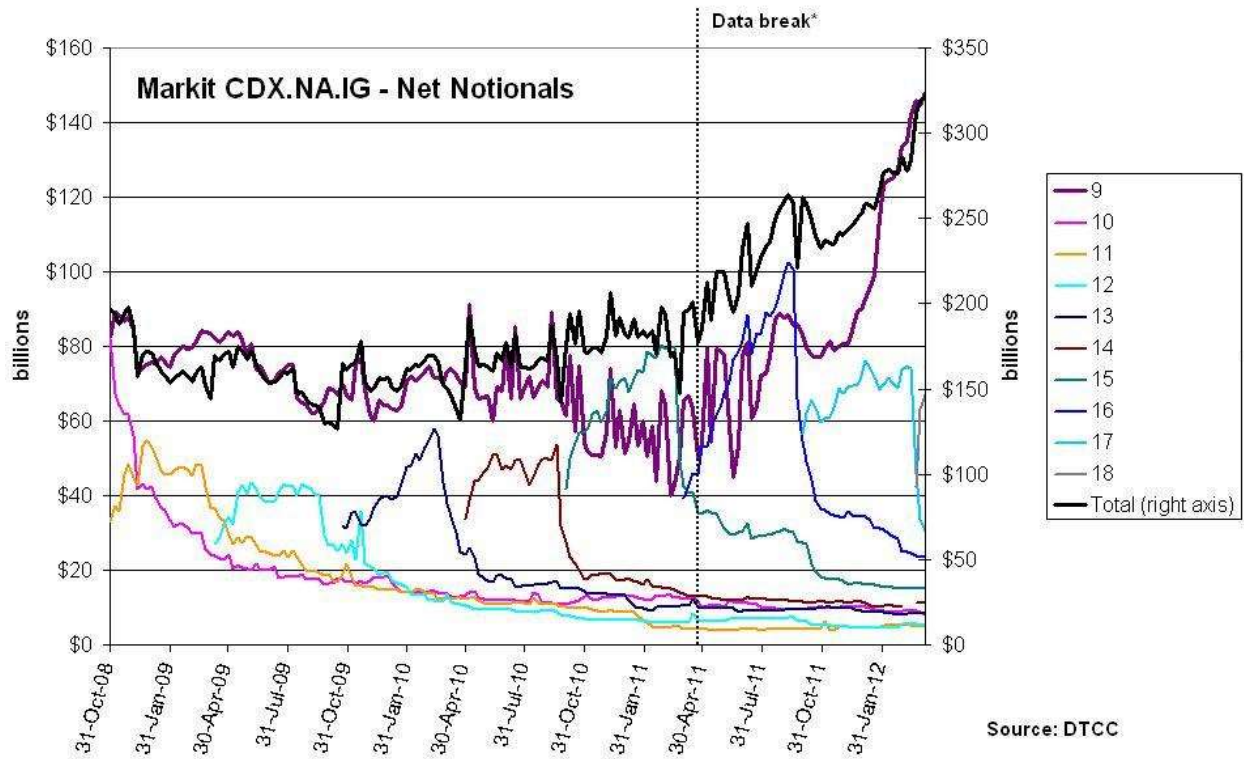
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Chart 1: CDX.NA.IG Volume Outstanding Data



From: Lisa Pollack, *Thar She Blows*, FT Alphaville Blog, Apr. 18, 2012, <http://ftalphaville.ft.com/2012/04/18/965141/thar-she-blows/>.

Chart 2: CDX.NA.IG.9 Price Data



From: Lisa Pollack, *Two Billion Dollar 'Hedge,'* FT Alphaville Blog, May 14, 2012, <http://ftalphaville.ft.com/2012/05/14/998601/two-billion-dollar-hedge/>.

Chart 3: Call Money Loans

% Increase over 1922

Data from Federal Reserve Banking and Monetary Statistics 1914-1941 (1943)

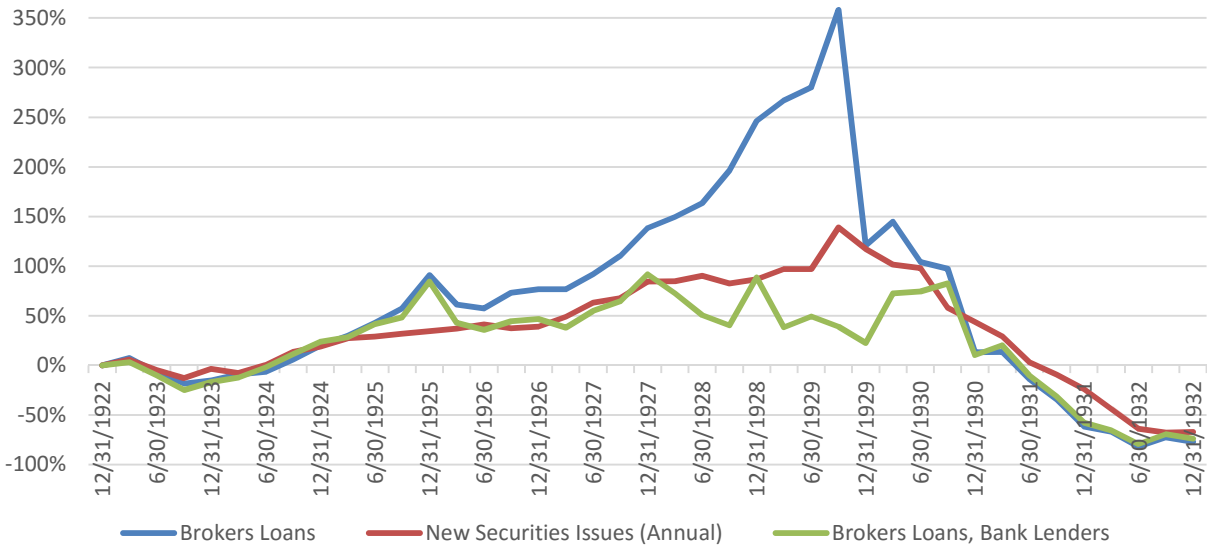


Chart 4: Money Market Rates

Data from Federal Reserve Banking and Monetary Statistics 1914-1941 (1943)

