Credit Risk Management's

Transformation

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The banking industry has undergone a remarkable transformation in the past 25 years. That transformation has included entry into areas once forbidden to banks by the restrictions of the Glass-Steagall Act. Equally dramatic, however, has been the revolution in how banks fulfill their traditional credit management role. This article will outline the history behind and future of this continuing revolution.

The Conventional Model of Banking

For most of the past three centuries, the accepted model of a bank has been that of an institution that accepts deposit liabilities and uses the proceeds to originate loans that are held on its books as assets until (we hope) they are repaid. A number of forces began to undermine this model in the 1970s. The first important event occurred in August 1971. In response to persistently rising inflation, the Nixon administration imposed temporary price controls and suspended the international convertibility of the U.S. dollar into gold. This effectively ended the post-World War II international monetary arrangements negotiated by 45 allied nations at Bretton Woods, New Hampshire, in July 1944. Financial markets were further disrupted by the first and second oil shocks in 1973 and 1979. Meanwhile, excessive money supply growth in the late 1970s led to double-digit inflation. The ensuing monetary clampdown, initiated by a Paul Volcker-led Fed in 1979, induced a prolonged period of double-digit interest rates. This in turn caused significant losses among banks due to serious maturity mismatches between long-term assets and short-term liabilities. This restrictive monetary policy also induced a prolonged recession in 1980-82 that weakened many borrowers and sent an increasing proportion of bank loans into default.

Another important development, the influence of which should not be minimized, was the introduction of personal computers during this period. Just as the painful impact of market volatility was hammering home the need for more sophisticated risk analysis, the PC moved computing into the hands of end-users and out of the exclusive control of IT professionals and the "big iron" mainframe world. It proved an ideal tool for developing and implementing a wide range of risk management analyses.

The Origin of Revolutions

A frequent dispute among historians is whether revolutions result from broad socioeconomic forces or are produced by the will of a powerful individual. Would the Reformation have occurred without Martin Luther?

Probably so, but as in all revolutions one man struck the spark that lit the flame. Arguably, the man who triggered the transformation that has overtaken banking in the past 25 years was Charles Sanford of Bankers Trust.[1]

Having started his career as a commercial lender in 1961, Sanford moved to his bank's oddly named Resource Management Department in 1969 and became its head in 1973. At the time, Resource Management was responsible for trading foreign exchange, federal and municipal government bonds, and various short-term financial instruments. The department was also responsible for funding the bank and managing its investment account. In this role, Sanford was struck by the lack of an effective framework to judge how well traders were doing their jobs. Gross trading profits struck him as an inadequate metric because it did not reflect differing levels of risk. This was the deficiency that Sanford set out to rectify. The approach that he developed involved allocating capital to various trading activities based on the potential losses associated with their positions. Returns were then scaled by this allocation of capital to produce a risk-adjusted return on capital, or RAROC.

From Trading to Lending

RAROC was originally rooted in mark-to-market accounting. There could be little argument about this in the trading world, because it reflected the standard accounting treatment for these activities. Eventually Sanford was convinced, however, that the approach needed to be extended to traditional banking activities where historical cost accounting was the norm. He saw two problems: Fixed-rate long-term loans funded by short-term liabilities had cost the bank dearly when rates spiked in the late 1970s. He addressed this problem by developing an internal funds-transfer mechanism that matched the repricing of funding to the maturity of an associated loan. In this way lenders could concentrate on the credit risk-and-return in isolation. The traders who managed the bank's funding were responsible for any gains or losses resulting from mismatched interest rate positions. Decoupling management of market risk on the balance sheet from credit risk on loans allowed specialists to focus on each area of risk individually.

How to extend RAROC to reflect the credit risk of loans was a more contentious issue. Many traditional bankers, accustomed to historical cost accounting, felt that hypothetical mark-to-market values were meaningless because they differed from the reported accounting numbers. Moreover, not all borrowers have outstanding publicly traded debt that will serve as a pricing benchmark. The solution developed at Bankers Trust was to implement an internal credit-rating system for all borrowers that mimicked the classifications of credit-rating agencies like Moody's and S&P. Once established, this system provided a basis for imputing changes in fair values based on both changes in credit spreads for comparably rated public debt and changes in an individual obligor's internal rating.

From Originate-and-Hold to Underwrite-and-Distribute

Charles Sanford drew one crucial conclusion from applying RAROC to traditional bank lending: The lumpiness and illiquidity of unsecured corporate loans made them far riskier than the supposedly freewheeling trading businesses. At the time he was reaching this conclusion, loan spreads were under pressure due to competition from the commercial paper and bond markets. This squeezed the returns on less risky secured and unsecured loans to the banks' strongest corporate borrowers. Sanford concluded that banks needed to transform their essential business model. They needed to shift from an originate-and-hold model to an underwrite-and-distribute model. More than anything else, this shift defines the transformation in banking over the past two to three decades.

Retail Asset-backed Securities

During the decades leading up to 1970, the U.S. housing finance market was rigid and notably fragile. Traditional savings and loan (S&L) institutions received tax advantages for specializing in home mortgage financing. Their assets and liabilities were generally highly mismatched with very long-term fixed-rate mortgage assets and relatively short-maturity deposit liabilities. Regulation Q further aggravated the situation for S&Ls by setting a ceiling on how high an interest rate they could pay on deposits. This made them vulnerable to periods of high interest rates that not only narrowed (or even eliminated) the spread between the return on their assets versus the cost of their liabilities, but also triggered deposit outflows.[2] The highly fragmented savings and loan industry also was vulnerable to localized economic downturns, since their mortgage assets were heavily concentrated in their immediate geographic markets. The only way for originators to shift mortgage assets off their books was through whole loan sales. This market was cumbersome and illiquid due to the heavy burden of paperwork and legal details surrounding every transaction. This was the backdrop for the highly successful introduction of asset-backed securities based on single-family residential mortgages.

Mortgage-backed Securities (MBS)

The origin of the U.S. mortgage-backed securities market is associated with an innovative federal initiative to

support home ownership. Government National Mortgage Association (Ginnie Mae) guaranteed mortgage pass-through securities were issued for the first time in 1970. This extended a federal government guarantee covering payment of principal and interest from pools of residential mortgages. In the words of Ginnie Mae's own Web site, "In a single step, the issuance of Ginnie Mae mortgage-backed securities converts individual mortgages into safe, liquid securities for investors around the world." Eventually, various private forms of repayment insurance were introduced. These ranged from third-party guarantees by organizations such as the Mortgage Guarantee Insurance Corporation (MGIC) to over-collateralization in the underlying asset pool. This type of instrument became increasingly popular throughout the 1970s and 1980s as its benefits to traditional lenders became clear. The most important consequence of this innovation was attracting capital from sources that would never have considered dealing with the paperwork and operational complexities of whole loan purchases. In so doing, it allowed local mortgage originators to continue providing new loans without being constrained to the volume of their deposits and other liabilities. In truth, the revolution that mortgage-backed securities triggered in the U.S. housing finance industry represents the first major shift of financial institutions from an originate-and-hold to an underwrite-and-distribute approach to their business.

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Other Asset-backed Securities

The diversification implicit in pools of many small loans and the effectiveness of statistical credit-scoring tools contributed to the growth of securities backed by other forms of retail obligations. In 1985, the mortgage-backed security concept was extended to collateralization of auto loans when Marine Midland Bank created what it called a Certificate of Automobile Receivables Trust (CARS). In addition to introducing a penchant for acronyms that was widely copied by other institutions, this opened market horizons to the possibility of collateralizing many other types of securities, including revolving credit card balances, student loans, trade receivables, and lease payments. Securities have also been structured based on stranded utility cost recoveries and movie and music royalties, among others. The opportunities offered by an expanding range of asset-backed securities based on traditional bank credit extensions further promoted an underwrite-and-distribute business model.

Segmented Payment Structures

The original mortgage- and other asset-backed securities were all structured on the basis of pro rata pass-through of cash flows. In essence, every investor in the pool was *pari passu* with every other investor on a pro rata basis. One problem this created was the need to deal with prepayment risk. Because U.S. mortgages are traditionally prepayable without penalty, investors faced the possibility of unexpected return of their investment. Moreover, early prepayment was most likely when interest rates had declined, creating a financial incentive for households to refinance. This was known as negative convexity, as early prepayments tended to accelerate at the worst time for investors (when rates had fallen) and also to slow at the worst time (when rates had risen). It was desirable to find a way to insulate reluctant investors from this risk, provided they were willing to pay a premium for such protection.

As part of the Tax Reform Act passed in 1986, Congress authorized the Real Estate Mortgage Investment Conduit (REMIC). It allowed cash flows to be allocated to different investors with different priorities. In many ways, this innovation was as significant as the original creation of mortgage-backed securities themselves. By structuring a variety of cash flow streams with different types and degrees of uncertainty, it was possible to attract a wider range of investors with distinctly different risk/reward preferences.

One of the most common ways of segmenting the cash flows was to allocate all early prepayments up to a certain level to one tranche, allowing holders of the other tranche to continue earning the pool's return on their full initial investment. This tranche structure was quickly extended to multiple tiers that absorbed prepayments only when all lower tiers had been fully repaid. This effectively insulated the higher tranches from much of the prepayment risk in traditional mortgage-backed securities and helped to attract additional conservative investors to the market. It also offered more risky equity tranches with correspondingly higher expected returns, which appealed to more speculative investors.

Commercial Loan Trading

Structures similar to retail asset-backed securities were slower to develop in the commercial loan arena, at least in part because complex special covenants and other idiosyncratic features made such loans much more

heterogeneous than retail credits. As with other types of assets, the first and most obvious way to distribute commercial loans after origination was simply to find willing buyers for an arm's-length sale. When Charles Sanford became president of Bankers Trust in 1983, he was already convinced that an originate-and-hold business model offered a poor risk/reward trade-off. He quickly pushed Bankers Trust toward establishing a functioning secondary market for commercial bank loans. One obstacle to this was that larger corporations had increasingly gained direct access to the capital markets and did not need the intermediary role of banks. This initiative was more successful relative to middle-market borrowers. Even here, however, traditionally captive middle-market corporate borrowers were finding increased access to public funding via the burgeoning high-yield bond market. Whole loan trading received a boost in 1985, when Chris Snyder founded Loan Pricing Corporation. This provided improved transparency in what had been an extremely opaque market. Nevertheless, many borrowers were uncomfortable with their loans being held by third parties at a time when relationship banking was still the norm. Customers' adverse reaction to sale of their loans acted as a constraint on growth in this market.

Early Credit Derivatives

Banks' desire for a means to diversify their credit exposures without impairing client relationships was an important stimulus to the next major financial innovation beginning in the early 1990s, namely credit derivatives. Here again, Bankers Trust was in the forefront accompanied by JP Morgan under the leadership of Blythe Masters. Credit derivatives were effectively an application of the abstraction concept implicit in interest rate swaps that had grown to significance in the early 1980s. An important attraction of credit derivatives was their anonymity. These were third-party contracts that did not involve the underlying entity except as a reference item in the agreement. As such, they did not even have to be disclosed to the subject company. Here, suddenly, was a completely anonymous means of shorting the credit risk of an entity to which a bank felt it had an unduly large exposure.

Originally, credit derivatives took the form of either a total return swap or a credit default swap (CDS).[3] The payments on the floating side of a total return swap were based on the combination of interest payments made on a reference bond plus the increase (or minus the decrease) in its market value during a payment period. Thus, the payer of the floating side was effectively being insured against loss in value, since its "payment" could conceptually be negative, meaning it was a net receiver of cash in that case. While this type of contract provided protection against credit deterioration of the issuer of the underlying bond, it failed to gain wide acceptance. The problem was that a bond's value could fall for reasons other than impairment of the issuer's credit standing. Rising interest rates or a general widening in credit spreads would have a similar impact. Credit default swaps rapidly swept the field because they effectively isolated the specific credit risk of a particular legal entity without entangling other extraneous risks in the process.

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1997 was the first year of reported outstanding contracts, with $55 billion reported for all U.S. commercial banks in the fourth quarter of that year. Over the following nine years, outstanding notional contracts in the U.S. have grown at an average annual rate of 76% despite an actual decline in 2001. Growth was an astonishing 134% and 148% in 2004 and 2005, respectively, before slowing to "only" 55% in 2006, ending the year at just more than $9 trillion in outstanding contracts.[4]

Multi-issuer Structures

While single-name default swaps are powerful credit risk management tools, they can be a cumbersome and costly means of protecting against credit losses for a broad portfolio. In many cases it is desirable to acquire protection against deterioration in a particular economic sector. For this type of coverage, a basket CDS is more effective. These take many forms such as first-to-default, nth-to-default, first-n-to-default, or all-to-default terms. In all cases, when a default occurs, the premium payer receives the difference between the initial value and the post-default recovery value of a reference asset of the defaulting name. Premium payments stop if no potential future default-based payments can occur. By choosing the underlying notional portfolio composition, it is possible to customize the coverage to the specific needs of a given protection buyer very effectively.

Collateralized Loan Obligations (CLOs)

As banks moved more aggressively into an underwrite-and-distribute mode, extending the asset-backed security concept to include commercial loans became a compelling proposition. In 1996, packaging commercial loan assets into collateralized loan obligations (CLOs) became increasingly common. This form of distribu-

tion has grown dramatically in recent years, becoming an important share of the total collateralized debt obligation (CDO) market. In the first quarter of 2007, $43.8 billion of new CLOs were issued globally. This was nearly twice the volume for the first quarter of 2006, despite a decline from 2006:Q4.[5] In addition to the cash CLO and cash CDO market, investment firms have worked to structure "synthetic" CLO and CDO transactions, also known as synthetic securitizations. In these structures, the underlying loan assets are left undisturbed on a bank's balance sheet; however, the credit risk from the pool of loans is placed in a special-purpose vehicle and that risk is then sold to investors[6] by the SPV, via the selling of CDS based on the default risk of the reference loan pool(s).

Moreover, leveraged or high-yield loans are an increasingly important form of collateral for these issues.[7] This has made the CLO market more open to absorbing middle-market loans that tend to dominate the commercial credit origination activities of smaller regional banks. In this way, it has encouraged application of the underwrite-and-distribute model to a wider range of banks. This has been accompanied by growth in the loan credit default swap (LCDS) market based on leveraged loans as their reference assets. Despite recent growth, the LCDS market represents only a fraction of the total of all leveraged loans outstanding. If it takes off and becomes a central means for holders of leveraged loans to hedge their exposures, the LCDS market could easily generate multi-trillions of dollars in outstanding contracts, comparable to the market for unsecured CDSs.

Summary

In retrospect, it may seem like a long and winding road, but the transition in American banking has actually unfolded with amazing speed. Stimulated by economic and financial volatility, encouraged by regulatory reform, and supported by advances in financial theory and the availability of powerful and affordable computing resources, the industry has been radically transformed in less than three decades.

Despite the changes to date, many questions remain. What are the implications for the future structure of the industry? How will the growing liquidity of credit risk affect balance sheet management? What kind of impact will revisions to accounting rules such as FAS 133 and 159 have? What will be the effect of revised supervisory requirements, especially Basel II? These and other questions will be addressed in future articles in this series. In next month's issue of *The RMA Journal*, we will consider the role of conceptual innovations in transforming credit risk management. ❖

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Notes

1 Much of the following commentary on Charles Sanford and Bankers Trust is based on Guill, Gene; *Bankers Trust and the Birth of Modern Risk Management*, forthcoming from the Wharton Financial Institutions Center.

2 The direct impact of deposit intermediation in depressing the housing market was long recognized as the most powerful channel by which higher interest rates slowed economic activity. This arrangement proved workable in a world of only modest swings in interest rates and relatively short periods of serious monetary constraint. It eventually buckled under the impact of prolonged double-digit inflation and interest rates in the late 1970s and early 1980s.

3 "Credit default swap" was and still is recognized as a blatant misnomer. It is really a credit default option with periodic premium payments. A more mundane, but probably more informative, name would be "credit default insurance policy." It is widely believed that "credit default swap" was chosen to avoid unwanted forms and sources of regulation.

4 See *OCC's Quarterly Report on Bank Derivatives Activities: First Quarter 2007*, p. 10. Note that the notional amount outstanding of credit default swaps globally grew 32% in the second half of 2006, rising from $26.0 trillion at June 30, 2006, to $34.4 trillion at December 31, 2006, according to ISDA.

5 See the Securities Industry and Financial Markets Association *Research Quarterly,* February 2007, p. 9, and May 2007, p. 9.

6 According to Crediflux, issuance of synthetic CDOs grew from $25.3 billion in 2004:Q3 to over $522 billion in 2006:Q3.

7 Leveraged loans are generally classified as those that meet any one of three conditions: 1) a bond equivalent rating below Baa3/BBB- from Moody's and S&P, respectively; 2) debt greater than three times EBITDA; or 3) yield greater than 125 basis points over LIBOR when first issued.