

# Cycles in Lending Standards?

---

John A. Weinberg

The lending activity of commercial banks has long received considerable attention as an important contributor to the performance of the economy. This attention has, perhaps, become sharper in the wake of the difficulties experienced by the banking industry in the 1980s. In recent years, the public perception of bank lending seems to have swung through a cycle. In the early 1990s, the prevailing view was that the bank loan market was experiencing a credit crunch in which banks set unreasonably high credit standards, denying credit to qualified borrowers.<sup>1</sup> By late 1994, with growth in bank loans picking up, some voiced concerns that banks were possibly becoming too loose in their standards for acceptable credit risks. These concerns appeared in the pages of the *American Banker* and other professional journals and in speeches by the Chairman of the Federal Reserve Board and the Comptroller of the Currency.<sup>2</sup>

Do swings from tightness to laxity in credit standards constitute an inherent part of bank lending activity? Some observers have suggested that such cycles can be caused by an imperfection in bank credit markets that results in a systematic tendency for banks to overextend themselves during general expansions of lending. In some expressions of this view, the imperfection is the result of government intervention in banking markets, while in others it results from the very nature of credit markets. In any case, the implied consequence is a cycle in lending behavior that is distinct from and may exert an independent influence on the general business cycle.

The existence of a systematic cycle in lending standards could have important public policy implications. If lending displays a bias toward too much

---

■ The author thanks Tom Humphrey, Mary Finn, Tony Kuprianov, and John Walter for their comments on an earlier draft. The views expressed in this article are the author's and do not necessarily represent the views of the Federal Reserve Bank of Richmond or the Federal Reserve System.

<sup>1</sup> For general discussions of credit crunches and the experience of the early 1990s, see Bernanke and Lown (1991) and Owens and Schreft (1995).

<sup>2</sup> See, for instance, Dunaief (1995), Connor (1995), and Stevenson (1994).

risk during expansions, resulting in increased risks of bank failures and losses to bank insurance funds, then bank regulation might justifiably seek to smooth out lending cycles. Placing greater scrutiny and restrictions on bank lending during periods of loan growth would slow the expansions but limit ensuing losses.

Justifying a regulatory policy aimed at eliminating or reducing cyclical swings in credit standards and lending activity requires that expansions of credit be inherently excessive. Excessive, however, is a relative term. A relevant question in this regard concerns the behavior of an “ideal” credit market, in which there is no source of market failure or government-induced distortion. Would such a market produce cycles in lending standards? This is the question that this article explores. First, Section 1 describes the notion of cycles in standards in a bit more detail. The following sections examine a stylized model of credit market behavior. This model suggests that lending standards might naturally be expected to change with market conditions. In fact, the model serves to make the point that in a well-functioning credit market, an expansion of lending almost necessarily implies an easing of standards and the extension of credit to “riskier borrowers.” This is true when borrower riskiness is defined in terms of borrower-specific characteristics drawn, for instance, from a commercial borrower’s recent income statement or balance sheet. These characteristics tell only part of the story of the true expected profitability of a loan to a particular borrower. Also important are aggregate conditions that affect the demand for the borrower’s product or the supply of its inputs. These factors are typically not well captured by borrower-specific indicators of credit quality.

## 1. CYCLES IN CREDIT STANDARDS

In discussions of bank lending activity, the notion of cycles in lending standards typically begins with expansions; standards fall with heightening competition in expansions and rise in contractions as banks respond to their own capital shortfalls or the constraints of regulators. On the downside, this view is related to the notion of a credit crunch, which has received much attention in recent years. On the upside, the view often seems to embody the belief that expansions of credit are inherently excessive. In March of 1995, for instance, the *American Banker* reported on growing concerns about easing credit standards and on warnings from the loan officers’ professional association advising lenders to resist competitive pressures and maintain credit quality.<sup>3</sup> Such warnings come very close to the caution voiced by Federal Reserve Chairman Alan Greenspan in speeches given in late 1994.

If, indeed, there is a natural tendency for expansions of credit to push down lending standards, then it would naturally follow that expansions would lead,

---

<sup>3</sup> See Mathews (1995).

at least sometimes, to significant increases in losses on loans. Further, the contraction phase of the credit cycle could be worsened as banks find themselves with bad assets on their books. Hence, under this view the primary driving force of cycles in the credit markets is the propensity of lenders to succumb to an unrealistic optimism in good times, creating lending booms that sow the seeds of their own demise. Just such a description of the cycle appears in some discussions by credit professionals.<sup>4</sup> In this sort of description the expansion of lending could, itself, be the impulse that drives the cycle, as a spontaneous wave of optimism hits the lending community. Alternatively, the expansion could be an overreaction to other shocks to the economy that “legitimately” shift the supply of or demand for credit.

The view of cycles outlined above is one of fluctuations in a number of variables. In this view, the cycle in lending standards coincides with the cycle in the amount of lending, while movements in the amount of lending are followed by movements in loan losses. In particular, an increase in lending activity is followed by an increase in losses. Does this pattern appear in the data? Figure 1 displays the behavior of the growth rate of total loans and loan charge-offs as a fraction of total loans at insured banks and thrifts in the United States from 1950 to 1992.

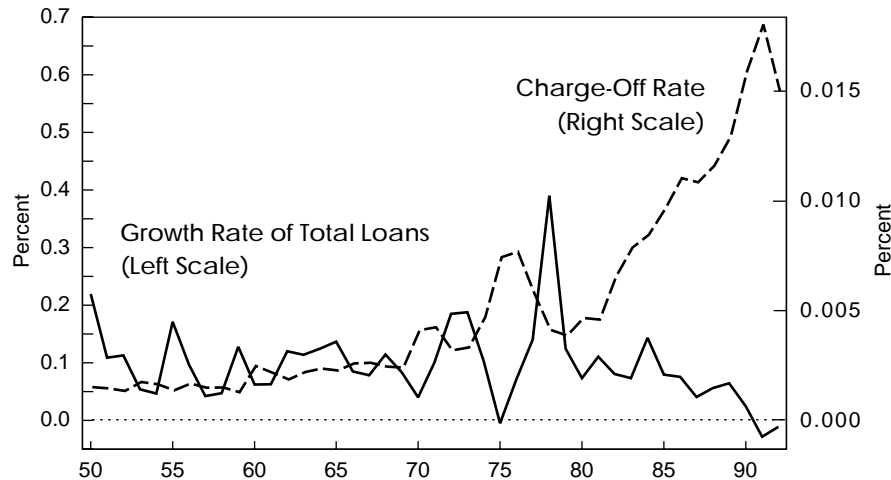
While the relationship is not striking, there do appear to be periods in which unusually strong loan growth preceded rising charge-offs. For instance, in 1972 and 1973, annual loan growth was about 18 percent compared to around 10 percent in 1971 and 1974. From 1973 through 1976, charge-offs, as a percent of total loans, grew from 0.33 percent in 1973 to 0.77 percent in 1976. It is important to note that accounting standards allow banks some discretion as to when to write off a nonperforming loan.<sup>5</sup> Consequently, charge-offs resulting from an episode of poor credit quality can be spread out over time, delaying and smoothing the apparent response of losses to an expansion of lending. The last several years of data in Figure 1 seem to reflect the downside of the cycle: an extended period of rising losses followed by a period of declining loan growth, culminating in two years of declines in the level of lending activity.

While not conclusive, the behavior of loan growth and charge-offs is not inconsistent with the notion of a cycle in lending standards. Alternatively, one might seek more direct evidence on lending standards. The Federal Reserve Board’s Senior Loan Officer Opinion Survey on Bank Lending Practices contains explicit questions on this topic. Schreft and Owens (1991) provide a detailed description of this survey evidence. Broadly stated, they find that loan officers’ self-professed tendency to tighten lending standards follows a cyclical pattern that tends to peak (attain the greatest tightening of lending standards)

---

<sup>4</sup> See, for instance, Mueller and Olson (1981) and Stevenson (1994).

<sup>5</sup> This issue is discussed in Darin and Walter (1994).

**Figure 1 Loan Growth and Charge-Offs**

just prior to or during general economic downturns. They find similar behavior in responses to questions about loan officers' general willingness and unwillingness to make loans. Further, peaks in the loan growth series in Figure 1 tend to occur at or around the troughs in the lending standards series studied by Schreft and Owens. In other words, the survey data suggest that low self-reported standards coincide with high growth in actual lending, while bankers report tightest credit around periods when lending growth is slow.

An additional source of information on lending standards could come from examining the characteristics of banks' borrowers. If borrowers' average financial conditions become weaker, then one might be able to conclude that standards have eased, especially if one can control for the general state of the economy. Cunningham and Rose (1994) perform such a study. They examine evidence on the financial conditions of small and mid-sized commercial borrowers. This evidence appears to be consistent with a general easing of standards from 1978 to 1988 and a tightening from 1988 to 1991. Except for 1978 itself, 1978 to 1988 was a period of fairly steady loan growth, with a few relatively strong years. By contrast, 1988 to 1991 was a period of generally declining loan growth. Hence, this study serves to confirm the general coincidence of changes in standards with movements in total lending activity.

The evidence discussed above is broadly consistent with the notion of cycles in lending standards. More difficult is the question of whether expansions represent a systematic tendency of banks to become too easy in the extension

of credit. There are at least two views as to what might drive lenders to display an excessively tolerant attitude toward credit risk. One view is that there is a fundamental imperfection in financial markets and, in particular, markets for bank credit. Under this view, the source of the imperfection seems to be that the credit quality of borrowers is difficult and costly to observe. Banks spend resources gathering information on borrower characteristics, but it is difficult for outside observers to verify the information obtained by the bank. Such limits to the flow of information form the basis of much of the recent work in the theory of banking. Limited information, however, does not necessarily imply a bias toward accepting greater risks. Indeed, if providers of funds feel that they are at an informational disadvantage, the cost of funds could be higher than in the case of perfect information. This could have the effect of making banks less willing to accept risks than they otherwise might be.

In some discussions of cycles in lending the supposed market imperfection simply seems to be a general failure of lenders to make good credit decisions. Sometimes this failure takes the form of basing decisions on the decisions of other lenders, rather than on an independent evaluation of market conditions. A model of banking markets that encompasses this view is presented by Rajan (1994). In that model, bankers are driven by a concern for their reputations, which could suffer if they fail to expand credit while others are doing so. Related to this view is the belief that competition drives lenders to ease their standards.<sup>6</sup> Hence, one might refer to this type of imperfection as the “herd mentality” problem.

The second, and perhaps more widely advanced view on the source of excessive risk tolerance by banks, is deposit insurance. It is well understood by now that federal deposit insurance has the potential of distorting banks’ attitudes toward credit risk, and indeed there is an extensive literature on this subject.<sup>7</sup>

There is nothing inherently cyclical in the distortion caused by deposit insurance. In fact, by placing a limit on the losses a bank can incur, deposit insurance is likely to have its greatest effect on incentives when the overall financial condition of banks is weak. This seems to run counter to the view of a lending cycle in which banks overextend in good times, making themselves vulnerable to adverse shocks. It is possible that the interaction of deposit insurance and the behavior of bank regulators could produce the type of cyclical behavior described. Such behavior could arise if the scrutiny of and restrictions on bank lending applied by examiners and regulators varied, after the fact, with observed performance of banks. While times are good, regulators might impose little interference, intervening only after significant losses have been incurred.

---

<sup>6</sup> This view is expressed in the discussion described by Randall (1994).

<sup>7</sup> A notable statement of the problem is given by Kareken (1983).

Some have argued that the “prompt corrective action” requirements for regulators in the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) embody just such a procyclical effect. On the other hand, recent, pre-FDICIA experience might be better characterized by a different pattern of regulatory response to changes in banks’ conditions. In particular, it is possible that regulatory forbearance during the 1980s resulted in too few restrictions on the activities of troubled banks.

Much of the research and writing on cycles in bank lending activity often has been driven by the observation that expansions in credit-risk exposure tend to be concentrated in a particular type of lending; lending for commercial real estate development in New England in the 1980s is a typical example.<sup>8</sup> From the point of view of an individual bank, loan concentration implies a loan portfolio that is, perhaps, not as well diversified as it might be. In an environment characterized by deposit insurance and bank regulation, concentrations could present a problem to regulatory agencies. The description of cycles driven by concentrated expansions of lending, however, is very similar to the more general description mentioned above; lenders take on excessive risks as the market is swept up in a lending euphoria that skews individuals’ evaluations of credit quality.

Each of the various views on market or regulatory failures driving cycles in lending behavior embodies some theory of the behavior of banks and financial markets. While each may have the ability to explain some aspect of observed behavior, the question remains: Compared to what? The following sections explore the implications of a benchmark model, in the absence of market imperfections or government intervention.

## 2. A MODEL OF A CREDIT MARKET

An explicit model of equilibrium in a market for loans is useful for interpreting observed lending patterns. The model presented below is one without many of the transaction costs and other frictions that are often thought to be important to banking and credit markets. While such frictions are probably important for an explanation of the institutional structure of these markets, they are not necessarily essential to every aspect of observed market behavior. Exploration of an “ideal” or frictionless model will help to uncover what aspects of observed behavior result from market frictions and what aspects arise simply from the competitive allocation of credit among heterogeneous borrowers.

First, it is useful to think of the activity in the model economy as taking place over two time periods. These two time periods might be thought of as a component of a more explicitly dynamic model, in which aggregate

---

<sup>8</sup> Randall (1994) summarizes the proceedings of a conference on this subject.

conditions evolve over time. A dynamic model would, ultimately, be better suited to closely matching the notion of cycles in lending standards. In the simple environment considered here, the forces that might drive cycles show up clearly in the comparative statics of the two-period version of the model. Since, in the model, lending standards arise as a characteristic of equilibrium, one can examine directly how changes in exogenous (to the decisions of market participants) market conditions change the equilibrium standards.

The demand side in the model economy's credit market is composed of a large number,  $N$ , of potential borrowers. Suppose that these are all business borrowers. Each borrower's business is particularly simple. A business requires a fixed amount of resources in the first period and, if successful, produces a fixed amount of output in the second period. If unsuccessful, the business produces nothing. Both input and output should be thought of as measured in monetary units, and, for simplicity, it is useful to set the value of the fixed amount of inputs required equal to one. The output of a successful business enterprise is denoted by  $Y > 1$ . This output, or revenue, should be thought of as being net of the opportunity cost of the business owner's time.

Borrowers' businesses vary in their likelihood of success. In general, probability of success might be thought of as depending on an array of borrower characteristics such as education, past business experience, and the nature of the product or service being produced. A detailed list of characteristics is beyond the scope of the model. Suppose that all of the relevant information about a borrower can be reduced to a single summary statistic, or "score," that can be expressed as a probability. Hence, a borrower's type is  $\phi$ ,  $0 \leq \phi \leq 1$ . An important market characteristic, then, is the distribution of individual borrower types, represented by a cumulative distribution function  $F(\phi)$ . That is,  $F(\phi)$  denotes the fraction of the population with type no greater than  $\phi$ . This fraction increases with  $\phi$ . Since  $\phi$  is a probability,  $F(0) = 0$  and  $F(1) = 1$ . This distribution function has an associated density, denoted by  $f(\phi)$  where  $f(\phi) \equiv F'(\phi)$ .

In addition to their individual types, businesses' prospects may depend on aggregate conditions. One way of introducing aggregate conditions into the model is to assume that the economy is subject to an aggregate technology shock that affects the output of successful firms. In this regard,  $Y$  should be thought of as a random variable, the realization of which is not known until firms observe their productive outcomes. Accordingly, a firm's output is the product of two random variables, its own success or failure and the aggregate shock to technology. The expected output for a firm of type  $\phi$  is  $\phi EY$ , where  $EY$  is the expected value of  $Y$ .

An important ingredient of any model of resource allocation among heterogeneous users is its information structure. The ability of market mechanisms to assign resources to their most productive users can depend on whether

individual productive capabilities are public or private information.<sup>9</sup> Similarly, if it is difficult for outsiders to observe a business's productive outcome, then the business may not be able to commit to payments contingent on that outcome. This limit on payment schemes can, in turn, limit the opportunities for gains from trade. In what follows, these complications are assumed away. This simplifying assumption is not based on a belief that informational frictions are not an important characteristic of financial market transactions. Indeed, such frictions are probably essential for understanding why financial institutions and contracts look the way they do. The assumption of perfect information allows the model to focus more directly on the implications of diversity among borrowers for the market allocation of credit.

Suppose that business owners have no funds of their own. Since there is an interval of time between the employment of inputs and the realization of output, providing a business with the funds to acquire inputs necessarily involves an extension of credit. If there are limited funds available for acquiring resources, or if there are alternative uses of funds that provide sufficient returns, then some businesses will operate and others will not. The credit market in this model economy allocates savers' funds to ultimate business borrowers and thereby determines which firms operate.

Business borrowers are assumed to be risk-neutral, caring only about the expected value of their profits. A business is willing and able to borrow funds if, after paying for the loan, it expects to cover at least the opportunity cost of its owner-manager's time. Since the resolution of uncertainty occurs between the extension and the repayment of the loan, the measure of the cost of credit relevant to the borrower's decision is the expected payment. This expected payment, or expected return from the lender's point of view, plays the role of the price in this market. That is, in order to attract funds, a borrower must be able to offer payments that have an expected value equal to the market return, denoted  $r$ .

Given a market return,  $r$ , any borrower whose expected output,  $\phi EY$ , is at least equal to  $r$  will be willing and able to profitably take a loan. Any such borrower can fashion a feasible repayment schedule that yields an expected return of  $r$  to lenders. Repayment schedules, here, are particularly simple. Since an unsuccessful business has no proceeds, no payment is made in that event. A successful business can make a repayment up to its realized output  $Y$ . Since  $Y$  is a random variable (common to all borrowers) that is realized before repayments are made, the repayment by a successful borrower can be contingent on  $Y$  as well as on the borrower's type,  $\phi$ . Hence, the repayment made by a successful borrower will be denoted by  $\rho(\phi, Y, r)$ , where  $r$  is added as an argument to indicate dependence on the required expected return.

---

<sup>9</sup> See Lacker and Weinberg (1993) for a discussion of private information in a model very similar to that in the present discussion.



The expected repayment from a type  $\phi$  borrower is  $\phi E_Y[\rho(\phi, Y, r)]$ , where the notation  $E_Y$  indicates expectation with respect to the aggregate random variable  $Y$ . An “acceptable” payment schedule is one that, given the borrower’s type, meets the market expected-return requirement. That is, to be acceptable, a schedule must satisfy

$$\phi E_Y[\rho(\phi, Y, r)] \geq r. \quad (1)$$

Recall that each loan is assumed to be one unit of funds. Therefore, given the required expected return,  $r$ , the demand for funds is simply given by the portion of the population of borrowers that can structure a payment schedule that yields an expected payment of at least  $r$ . The most a successful borrower can pay is the entire realized output,  $Y$ . A borrower who agrees to pay this maximum for all realizations of  $Y$  will be just indifferent between borrowing and remaining idle. The lowest-type borrower for whom obtaining a loan that the market finds acceptable will be worthwhile is the borrower for whom  $\phi EY = r$ , or  $\phi = r/EY$ . Hence, the demand for funds is the number of borrowers with  $\phi \geq r/EY$ . Accordingly, demand can be expressed as a function of the required return and the expected value of the aggregate technology shock:

$$D(r, EY) = [1 - F(r/EY)]N. \quad (2)$$

The right-hand side of this equation is simply the size of the population,  $N$ , times the fraction of borrowers with probabilities of success above the cut-off value,  $r/EY$ . Notice that this function has the usual property of a demand function: demand is decreasing in the cost of funds,  $r$ . In addition, all businesses are willing to borrow when  $r = 0$ , and none will be willing when  $r = EY$ .

Given a cost of funds, the cut-off value of the individual probability of success resembles a credit standard. This probability of success is assumed to be a function of the observable characteristics of the borrower. Hence, setting a minimum level for  $\phi$  amounts to establishing a standard based on borrowers’ characteristics.

In addition to borrowers, the economy is populated by other individuals who are endowed with funds in the first period, but may seek to save some of those funds for consumption purposes in the second period. Depending on the existence of alternatives, some or all of these funds may be saved in the form of loans to the business borrowers described above.

The behavior of savers will not be as carefully described as that of borrowers. For purposes at hand, it is sufficient to specify a function,  $S(r)$ , that determines the aggregate savings available to business borrowers. This function could take a variety of forms. One possibility is that  $S(r)$  is a constant value (perfectly inelastic). This would occur if loans to businesses constituted the only outlet for savings and if savers’ preferences were such that their desired

savings were independent of the rate of return.<sup>10</sup> Alternatively, if the business borrowers represent only a small portion of the economy's demanders of funds, then the supply of funds to this small sector can be treated as perfectly elastic; as much funding as is demanded will be forthcoming so long as borrowers are able to pay an expected return at least as great as that available elsewhere in the economy.

A last possibility for the behavior of savers arises if, for instance, they use first-period funds for both first- and second-period consumption, and if the only means of saving is through loans to businesses. In this case, savings increase with  $r$ . The key maintained assumptions about  $S(r)$  are that  $S(0) < N$  and  $S(EY) > 0$ . The first of these two assumptions assures that if credit is free, demand exceeds supply. The second implies that there are at least some rates of return for which supply exceeds demand.

In addition to the expected return, savings may depend on other aggregate conditions. For instance, one might imagine variation in savers' first-period endowment. This endowment might be, in part, the result of an aggregate shock in the first period that may, in turn, affect people's expectations about the second-period technology shock. Hence, one can imagine shifts in aggregate conditions that cause shifts in both the supply of funds by savers and the demand of borrowers.

To this point, there has been no mention of the role of intermediaries in the credit market. The model's specification is such that intermediaries are not necessary to allocate effectively the economy's resources among borrowers. In fact, borrowers could sell securities, offering prorated shares of the payment schedules,  $\rho(\phi, Y, r)$ . In equilibrium, a saver might own shares of the securities issued by a variety of borrowers. The ability of borrowers to contract directly with the savers arises from the absence of informational frictions in the model.

Although intermediaries are not necessary, one can imagine credit in this economy flowing through institutions that take the funds of savers, in exchange for some promised return, and distribute those funds to borrowers. Borrowers, then, make the payments  $\rho(\phi, Y, r)$  to the intermediaries, who use those payments to pay the savers. If the activity of intermediating is costless and if there is free entry into this activity, then, in equilibrium, intermediaries will have zero profits and the allocation of resources will be the same as in the case of the direct securities market. While the discussion that follows will adopt this interpretation of an intermediated credit market, note that the model applies more generally to the competitive allocation of credit, with or without intermediation.

It is assumed that all market participants—borrowers, savers, and intermediaries—take the expected return,  $r$ , as given in making their economic

---

<sup>10</sup> For instance, if savers care only about consumption in the second period, then they will save all of their resources, regardless of the rate of return.

decisions. Under the intermediary interpretation, intermediaries attract total savings of  $S(r)$ , accept loan applications from borrowers, and adopt a lending standard. A lending standard, here, is simply a rule stating the minimum acceptable probability of success. A type  $\phi$  borrower takes a loan from the intermediary that offers the lowest expected repayment,  $E_Y[\rho(\phi, Y, r)]$ , among those that are willing to accept a type  $\phi$  credit risk.

### 3. EQUILIBRIUM

The equilibrium expected return equates savers' supply of funds to the demand of the borrowers. Hence, equilibrium can be represented by a standard supply and demand diagram, as in Figure 2.<sup>11</sup> The market-clearing return, denoted  $r^*$ , in turn determines the minimum acceptable probability of success. This lending standard,  $\hat{\phi}$ , satisfies

$$\hat{\phi}EY = r^*. \quad (3)$$

Given this cut-off, the aggregate amount of credit extended is  $N[1 - F(r^*/EY)]$ . Competition assures that each loan makes zero expected profits for the lender. This zero-profit condition implies that repayment schedules for borrowers of type  $\phi$  are such that  $\phi E_Y[\rho(\phi, Y, r^*)] = r^*$ . Note that all loans are risky in the sense that a borrower only makes payments when successful (with probability  $\phi$ ). Hence, for all but the best borrower (type  $\phi = 1$ ) there is a positive markup between the average contractual repayment rate,  $E_Y[\rho(\phi, Y, r^*)]$ , and the cost of funds,  $r^*$ . Notice, also, that this markup gets larger as the probability of success,  $\phi$ , gets smaller.

All lending brings with it an expectation of losses. A loss will be said to occur when no payment is made. This amounts to defining default as arising only from the borrower-specific failure to produce, not from variations in payments arising from changes in the aggregate shock. That is, the loss on a failed borrower is equal to the payment that would have been expected had that borrower succeeded. For a type  $\phi$  borrower, then, the expected loss to the lender is weighted by the probability of failure:

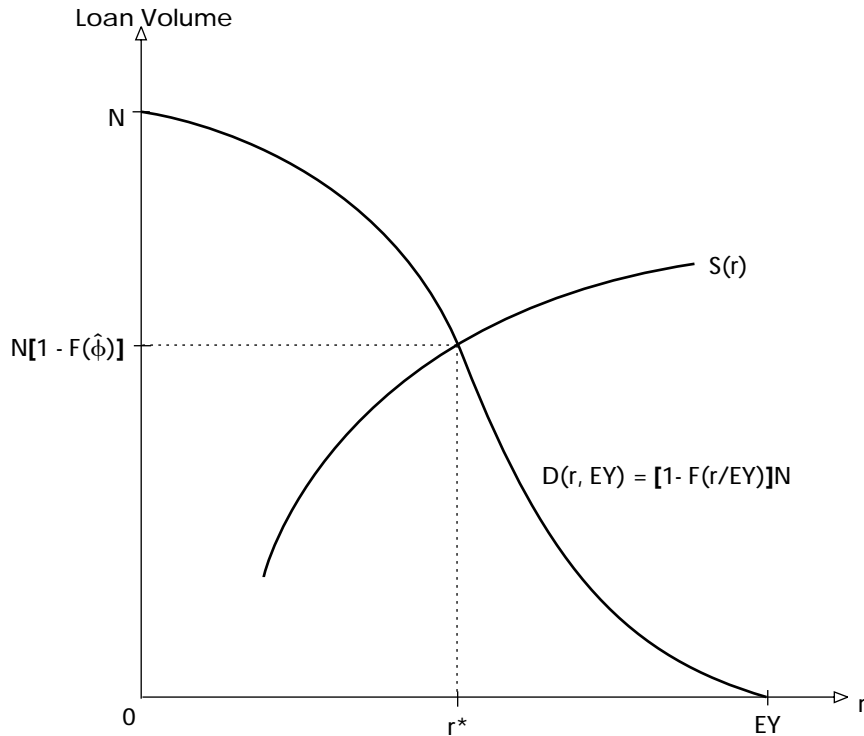
$$L(\phi, r^*) \equiv (1 - \phi)E_Y[\rho(\phi, Y, r^*)] = \frac{(1 - \phi)}{\phi}r^*. \quad (4)$$

Note that  $L(\phi)$  is decreasing in  $\phi$ , as one would expect.

Equation (4) gives a narrow specification of losses. A loan to a given borrower suffers a loss only if that borrower fails to produce a positive output. A broader specification of losses might include shortfalls of payments caused by bad realizations of the aggregate shock. For instance, one might define a loss as occurring any time the realized payment is less than  $E_Y[\rho(\phi, Y, r^*)]$ .

---

<sup>11</sup> Note, however, that in Figure 2, price is on the horizontal axis.

**Figure 2 Supply and Demand in the Credit Market**

This broader specification would complicate the analysis without changing the essential fact that expected losses rise as the probability of success falls.

The narrower specification of losses,  $L(\phi)$ , treats as losses only those shortfalls resulting from borrower-specific performance. With the narrow specification, changes in the equilibrium lending standard will affect expected aggregate losses primarily through the change in the riskiness of loans made. Since this interaction is the intended focus of this article, the narrow specification is sufficient. Expected aggregate losses, per loan made, are given by

$$\bar{L}(r^*) \equiv \frac{1}{[1 - F(r^*/EY)]} \int_{r^*/EY}^1 L(\phi, r^*) f(\phi) d\phi. \quad (5)$$

The right-hand side of equation (5) is the expected value of the function  $L(\phi, r^*)$ , given that  $\phi$  is greater than the threshold value  $\hat{\phi}$ . For each type,  $L(\phi, r^*) f(\phi)$  gives the expected losses weighted by that type's weight in the

population's distribution of types. The integral, then, can be viewed as adding up these weighted expected losses across all borrowers that receive loans. Dividing by the number of borrowers receiving credit gives average losses.

The competitive equilibrium described above achieves an efficient allocation of funds.<sup>12</sup> Given the expected technology shock, the market extends credit to businesses from the top down, until the supply of funds has been exhausted. In other words, it is impossible to find two businesses, one funded and one unfunded, such that the unfunded firm has a higher probability of success. There is no "credit rationing" in the sense that the term is often used. All borrowers who are willing and able to pay the required return (in expected value) receive loans.

#### 4. COMPARATIVE STATICS

As presented above, the key exogenous variable in the model is  $EY$ , the expected value of the aggregate shock. Accordingly, all of the endogenous variables determined in equilibrium are functions of  $EY$ . Expectations, of course, are not truly exogenous variables. Rather, economic decisionmakers form expectations by observing current conditions and making assumptions about the relationship between current conditions and future conditions. Recall that the model's description specifies a two-period time horizon. The market for funds allocates credit in the first period, based on expectations of conditions in the second period. The expectation  $EY$ , then, may be a function of some condition observed in the first period. Since that condition would be exogenous to the decisions made by borrowers and lenders, including the additional variable would contribute little to the current analysis. This section, therefore, simply treats  $EY$  as an exogenous variable and examines how the endogenous variables respond to changes in  $EY$ .<sup>13</sup>

In terms of Figure 2, an increase in  $EY$  brings about an increase in demand, as represented by an outward shift of the demand curve. For any required return, the set of borrowers who can profitably meet that requirement grows as  $EY$  rises. Specifically, the marginal borrower is that for whom  $\phi EY = r$ ; this is the borrower who, if promising payments with expected value  $r$ , has expected earnings net of payments just equal to zero. An increase in  $EY$  lowers the marginal type. Hence, as expected aggregate conditions improve, riskier borrowers become acceptable for any given required return.

---

<sup>12</sup> A deeper discussion of the efficiency of equilibrium would have to include a more explicit treatment of the economic decisions made by savers; as long as those decisions are such that an equilibrium exists and there are no externalities, equilibrium will be efficient (Pareto-optimal).

<sup>13</sup> More precisely, the distribution of  $Y$  is assumed to be subject to exogenous changes. Market participants are aware of the true distribution when they make their first-period decisions and, hence, form expectations rationally.

Of course, since more businesses are able to borrow profitably at any given return, market forces will cause the equilibrium required return,  $r^*$ , to rise if, as in Figure 2, the supply of funds depends on the return to saving. The overall change in the lending standard,  $\hat{\phi}$ , is

$$\frac{d\hat{\phi}}{dEY} = \frac{d}{dEY} \left[ \frac{r^*}{EY} \right] = \frac{dr^*}{dEY} \frac{1}{EY} - \frac{r^*}{(EY)^2}. \quad (6)$$

The right-hand side of this expression includes a direct and an indirect effect. The direct effect is given by the second term; for a fixed required return,  $r^*$ ,  $\hat{\phi}$  falls as  $EY$  rises. The first term is the indirect effect that comes from the change in  $r^*$ . If the increase in demand causes  $r^*$  to rise, then the rising cost of funds will dampen the decline in the lending standard. If the supply of funds is not perfectly inelastic, the equilibrium lending standard falls, and credit is extended to a wider range of borrowers as  $EY$  rises. If supply is perfectly elastic (for instance, if this credit market is a small portion of broader financial markets), then the first term on the right side of equation (6) is zero and only the direct effect on  $\hat{\phi}$  is present.

Since all loans have some risk of loss, the expansion of lending when expected conditions improve causes expected losses on loans to rise. Expected losses, however, also rise as a percent of total loans. That is,  $\bar{L}(r^*)$  rises as  $EY$  rises. This can occur for two reasons. First, as seen in equation (4), the expected loss on a loan to any given borrower rises if  $r^*$  rises. Second, expansion of lending comes at the bottom of the range of acceptable credit risks. Hence, added borrowers bring greater-than-average expected losses.

Closely related to loan losses is the average markup of repayments by businesses that do not fail over the cost of funds,  $r$ . This markup for a type  $\phi$  borrower is  $E[\rho(\phi, Y, r^*)]/r^*$ . Since, in equilibrium,  $\phi E[\rho(\phi, Y, r^*)] = r^*$  for all acceptable borrowers, the markup for a type  $\phi$  borrower is simply  $1/\phi$ . Therefore, for any given borrower, the average markup of repayment (conditional on successful production) over the lender's opportunity cost of funds is independent of aggregate conditions. Accordingly, the average markup across borrowers rises as the lending standard,  $\hat{\tau}$ , falls with a rising  $EY$ . Additional borrowers have a higher risk of failure and, therefore, must make greater average payments, conditional on success.

## 5. DISCUSSION

Can the model presented above yield insights into cycles in lending standards? Recall that in a fully dynamic model, aggregate conditions would evolve according to a process that would allow market participants to form the expectation,  $EY$ , using observations of current and, perhaps, past conditions. More precisely,  $EY$  would be a function of at least the most recently observed productive (or profit) experience of successful business firms.

If there is persistence in the aggregate technology shock that determines  $Y$ , then expected output is high when current output is high. Hence, loan growth and falling standards occur during good economic times. Since a lower standard means the extension of credit to borrowers with a higher risk of default, it seems as though movements in the lending standard can have the effect of widening the swings in the economy, especially in downturns. If, when expectations were high, a downturn occurs because of a low realization of  $Y$ , output falls not just because of the low aggregate shock, but also because of the higher number of failures of marginal borrowers. On the other hand, if the economy experiences a string of good aggregate performance, it is possible to have a period of rising losses while total loans and economic activity continue to grow. This possibility might be reminiscent of much of the expansion of the U.S. economy in the 1980s.

In the model outlined above, changes in lending and lending standards come entirely from the demand side of the market. It may be reasonable to suppose that changes in aggregate conditions also affect the supply of funds. In particular, if a high current value of the output of successful firms means that savers' total resources are correspondingly high, then the supply of funds may expand together with the demand. This would tend to reinforce the effect of aggregate shocks on the expansion of credit while making the effect on expected returns ambiguous.

Popular discussions of changes in lending standards often implicitly treat these changes as originating from the supply side. When standards rise, for instance, there are often references and anecdotes concerning borrowers who are being rationed out of the market. Such references seem to suggest that demand has not changed, but that borrowers who are willing and able to take loans under prevailing market conditions are being denied credit. Casual evidence, however, is difficult to interpret, particularly when credit flows from suppliers to demanders through intermediaries. One can interpret the model presented above as one of an intermediated market. Under this interpretation, for the market to achieve its equilibrium allocation it is not necessary for borrowers to be aware of aggregate conditions. If every borrower submits applications to one or more banks, then the banks, knowing the aggregate condition, will make credit decisions according to the equilibrium described above. Hence, the perceptions of borrowers who get screened out as standards rise (as  $EY$  falls) can be misleading.

Another aspect of popular discussions of variations in lending standards is the degree of competition among intermediaries. As in late 1994 and early 1995, observers often point to rising competition as a cause of weakening bank standards. The model presented in this article, as a model of perfect competition, cannot capture rising competition. Presumably, if competitiveness is to vary, competition must be imperfect. Imperfect competition might arise from technological or legal barriers to entry. Procyclical competitiveness might arise

if lenders in an imperfectly competitive market find it more difficult to refrain from aggressive competition during expansions. This sort of varying competition would reinforce the countercyclical lending standards of this article's model.

The model clearly does not imply that a goal of supervision and regulation of financial intermediaries should be to encourage "smooth" lending standards that do not vary with aggregate conditions in the economy. Rather, the model implies that in times of strong and improving economic activity, businesses (and households) whose individual characteristics make them look risky may become acceptable borrowers. A policy aimed at smoothing credit standards would limit the ability of participants in the economy to adapt to changing economic conditions and to take productive risks when those risks are warranted.

Of course, the existence of regulatory oversight of bank activities seems to presume a bias toward excessive risk taking on the part of banks. The source of that presumption is deposit insurance. It is not clear why the adverse incentive created by deposit insurance should be greatest during periods of strong economic performance and expanding credit. If anything, deposit insurance should have its greatest effect on incentives at the other end of the cycle in credit market conditions. The argument in the literature on this topic is that insured lenders may have an incentive to "bet the bank" when they are in weak financial condition. This suggests that regulatory scrutiny of bank lending behavior should be greatest during a period of low returns (profitability) for banks.

## 6. CONCLUSION

Lending standards are usually thought of in terms of requirements placed on the characteristics of individual loans and borrowers. A central point of this article is that there is a natural tendency for standards to vary inversely with the level of activity in the credit markets. There is, of course, a sense in which lending standards do not vary at all in this article's model. The marginal borrower is always that borrower who can just afford repayment terms that just cover (in expected value) the opportunity cost of savers' funds. That the quality of the marginal borrower varies is the result of the interaction of individual and aggregate conditions in determining the payoff to extending credit. As (expected) aggregate conditions improve, a borrower who did not look creditworthy yesterday may now be deserving of credit.

The frictionless model examined herein is missing many of the ingredients that are perhaps important to the character of modern credit markets and institutions. Even with further complications, however, the fundamental role of the credit market would be the same. Given perceptions of the general condition of the economy, the credit market sets a threshold for acceptable risks. If the market functions well, subject to whatever imperfections may be present in



the economic environment, then an improvement in participants' perceptions of aggregate conditions will lower the threshold.

The concerns about credit quality that are often expressed in times of expanding credit are typically driven by very current news. A more "global" perspective would recognize the interaction of individual and aggregate conditions. The model examined in this article suggests that a policy goal of credit standards that are constant over time is not only unwarranted, but could be counterproductive.

---

---

## REFERENCES

- Bernanke, Ben S., and Cara S. Lown. "The Credit Crunch," *Brookings Papers on Economic Activity*, 2:1991, pp. 205–47.
- Connor, John. "Comptroller Unveils Credit Committee, Citing Slippage in Banks' Loan Standards," *The Wall Street Journal*, April 10, 1995, p. 2.
- Cunningham, Donald F., and John T. Rose. "Bank Risk Taking and Changes in Financial Condition of Banks' Small and Midsized Commercial Customers, 1978–1988 and 1988–1991," *Journal of Financial Services Research*, vol. 8 (December 1994), pp. 301–10.
- Darin, Robert M., and John R. Walter. "Were Bank Examiners Too Strict with New England and California Banks?" Federal Reserve Bank of Richmond *Economic Quarterly*, vol. 80 (Fall 1994), pp. 25–47.
- Dunaief, Daniel. "Bankers Agree: Credit Standards Have Been Sliding," *American Banker*, April 11, 1995, pp. 1 and 24.
- Kareken, John H. "Deposit Insurance Reform or Deregulation Is the Cart, Not the Horse," Federal Reserve Bank of Minneapolis *Quarterly Review*, vol. 7 (Spring 1983), pp. 1–9.
- Lacker, Jeffrey M., and John A. Weinberg. "Coalition Proof Equilibrium in a Private Information Credit Economy," *Economic Theory*, vol. 3 (Spring 1993), pp. 279–96.
- Mathews, Gordon. "Worries Grow that Downturn in Economy Could Punish Banks for Easing Credit," *American Banker*, March 27, 1995, pp. 1 and 28.
- Mueller, Henry P., and Leif Olson. "Credit and the Business Cycle," in Herbert V. Prochnow, ed., *Bank Credit*. New York: Harper and Row, 1981, pp. 78–91.
- Owens, Raymond E., and Stacey L. Schreft. "Identifying Credit Crunches," *Contemporary Economic Policy*, vol. 13 (April 1995), pp. 63–76.

- Rajan, Raghuram G. "Why Bank Credit Policies Fluctuate: A Theory and Some Evidence," *Quarterly Journal of Economics*, vol. 109 (May 1994), pp. 399–441.
- Randall, Richard E. "Safeguarding the Banking System in an Environment of Financial Cycles: An Overview," *New England Economic Review*, March/April 1994, pp. 1–13.
- Schreft, Stacey L., and Raymond E. Owens. "Survey Evidence of Tighter Credit Conditions: What Does it Mean?" Federal Reserve Bank of Richmond *Economic Review*, vol. 77 (March/April 1991), pp. 29–34.
- Stevenson, Bruce G. "Research Report . . . Capital Flows and Loan Losses in Commercial Banking," *Journal of Commercial Lending*, vol. 77 (September 1994), pp. 18–26.