Advancing the Credit Channel and Credit Rationing in the Undergraduate Curriculum: A Useful Model

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ABSTRACT

This paper introduces a model of the lending decision that accounts for credit rationing behavior as it captures fundamental aspects of the credit channel of monetary policy. The model distinguishes between the credit channel's bank-lending and balance-sheet effects in its representation of how different types of shocks influence lending. It is hoped that the model will facilitate and encourage greater attention in the undergraduate curriculum to the credit channel as well as credit rationing, the significance of both having been accentuated by the recent sub-prime lending crisis and the Fed's expanded responsibilities in the financial markets.

Introduction

The mainstream idea that one of monetary policy's effects occurs via its alteration of the backdrop in which participants in the credit markets cope with imperfect information – often called the credit channel of the monetary transmission mechanism – receives little attention in undergraduate macroeconomic textbooks when it is mentioned at all. The same could be said for the concept of credit rationing. Money and banking textbooks more dependably present both ideas, but cursory descriptions are provided at best. There are several factors that could be contributing to this situation.

The poor coverage of credit activity's contribution to the monetary transmission mechanism (beyond what the changes in reserves under fractional reserve banking suggests) may be because of the difficulty in discerning whether or not there is a consensus regarding its macroeconomic significance. Although highly respected economists have identified it as an important consequence of monetary policy, there have been few papers focusing on the opposite hypothesis. The absence of a countervailing literature might not necessarily indicate a belief that such credit effects are important as much as it reflects the difficulty in proving a negative which, in this case, would require specifying models that provide compelling evidence that they are inconsequential.

A complicating factor is the lack of a clear consensus on labels for the credit ramifications of monetary policy. The effect that most consistently goes by the same name is the *bank lending channel* (discussed below). But a second effect that is often labeled the *balance sheet channel* (also discussed below) is also referred to as a *financial-accelerator*. In an influential paper, Bernanke and Gertler (1995) presented the bank lending channel and the balance sheet channel as the two components of the *credit channel of the monetary transmission mechanism*, but others speak of the *credit view* (e.g., Mishkin 2010) or of a *pure credit channel* which includes the bank lending channel, but not the balance sheet channel (e.g., Handa 2009). To avoid confusion, this paper will confine itself to Bernanke and Gertler's nomenclature in the following discussion.

Presenting credit rationing is complicated by the fact that it refers to a very different kind of activity than is usually associated with (non-price) rationing. The standard connotation of rationing has the available supply of the rationed good distributed according to some governing body's plan as opposed to being allocated by the market. In great contrast, credit rationing is the result of market activity and, indeed, would occur in completely liberalized financial markets. Its classification as "rationing" is due to the apparent existence of an excess demand for credit, i.e., there are more funds being sought by borrowers at the market interest rate than are supplied by lenders. But similar reasoning could characterize

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unemployment as the result of "job rationing" if those who are unsuccessfully seeking employment at the going wage are viewed as evidence of an excess demand for jobs.

A second reason that credit rationing might receive little mention is because the theory of credit rationing is more involved than standard market theory. Understanding credit rationing is complicated by the need to modify the basic market approach to account for the *quality* of the marketed good being sensitive to the price at which it is exchanged. More specifically, the perceived likelihood that a particular loan will ultimately be repaid varies inversely with the interest rate charged. But this peculiarity alone would not seem to explain the concept's limited exposure in macroeconomic textbooks since efficiency wage theory predicts a comparable sensitivity of the quality of labor to the wage that is paid, and it is dependably presented.

One further reason why both the credit channel and credit rationing receive little mention in the macroeconomics and money and banking curricula may simply be the lack of an available model that concisely captures either idea. In that event, this paper introduces a simple model of lending behavior that specifies a lender's credit rationing view of a lending opportunity. The model not only captures the microfoundations of lending behind the credit channel of the monetary transmission mechanism, it does so in a way that distinguishes between the bank lending channel and the balance sheet channel.

The paper proceeds in the next section by reviewing the credit channel and credit rationing literatures and their coverage in undergraduate macroeconomic as well as money and banking textbooks. The following section introduces and demonstrates the simple model of lender behavior.

Whatever the reason for the low profiles of the credit channel of monetary policy and credit rationing in the economics curriculum, the recent economic and financial crisis has renewed the relevancy of both topics. The sub-prime mortgages that arguably precipitated the crisis would seem to have been a consequence of too little credit rationing, implicitly recommending that the concept of credit rationing be taught to future financial intermediaries and their regulators. Meanwhile, the crisis has forced the Fed to shoulder greater responsibility for credit market activity, and one way it is thought to significantly affect credit is through the credit channel.

The Credit Channel, Credit Rationing, and Their Coverage in Textbooks

Bernanke (1983) advanced the macroeconomic significance of credit by arguing that the destruction of "information capital" contributed to the severity of the drop in output during the great depression. Subsequent research distinguished between the two different components of what was to be called the credit channel: the bank lending channel (Blinder 1987, and Bernanke and Blinder 1988) and the balance sheet channel (Gertler 1988, Bernanke and Gertler 1989, and Bernanke 1993).[2] The bank lending channel maintains that a contraction in reserves will – in addition to directly reducing the amount of credit that banks could potentially extend – throw a wrench in the banks' financial intermediation machinery that reduces credit further. Banks deal with greater asymmetric information problems than exist in other credit markets (e.g., bond markets), making contractionary monetary policy more disruptive of their activities. Specifically, many banks are relatively small players in the credit markets and are at a disadvantage relative to larger lenders in finding funds to lend when reserves are reduced. Furthermore, it is these banks that serve and have relationships with many small borrowers who – when forced to turn to new lenders to obtain the credit that their usual small lenders are not providing – face higher financing costs due to the new lenders' unfamiliarity with them. The resulting reduction in credit from this bank lending channel is not the result of a direct constraint on credit but, instead, a consequence of less efficient financial intermediation due to lost information.

The balance sheet channel depends on monetary policy influencing the interest rate, where a change in the interest rate affects the balance sheets of prospective borrowers and, therefore, their credit-worthiness. For example, an increase in the interest rate normally corresponds to a fall in asset prices along with the present value of expected cash flows, both of which will hurt prospective borrowers' balance sheets and make them greater lending risks, causing them to receive less credit.

Presentations of the credit channel by intermediate macroeconomics textbooks range from brief to non-existent. Abel et al. (2008) devote a page to the credit channel (pg. 553). Blanchard (2009) includes the

[2] For more complete surveys of the credit channel literature, see Gertler 1988, Bernanke 1993, Gertler and Gilchrist 1993, Dimsdale 1994, Kashyap and Stein 1994, Bernanke and Gertler 1995, Cecchetti 1995, Hubbard 1995, and Bernanke, Gertler, and Gilchrist 1996.

term in the glossary, but does not explain it within the text. Barro (2008), Mankiw (2007) and Williamson (2008) do not mention either the bank lending or balance sheet channels.

Among Money and Banking textbooks Hubbard (2008) introduces and considers the bank lending and balance sheet channels (but does not use the term "credit channel") in a chapter entitled "Information Problems and Channels for Monetary Policy" (pp. 635-656). Cecchetti (2008) devotes roughly a page to each of the bank lending and balance sheet channels, as does Mishkin (2010) who refers to them as components of the "credit view of the monetary transmission mechanism." However, Ball (2009) and Miller and VanHoose (2006) cover neither of them. More comprehensive treatments of the credit channel are found in more advanced books on monetary economics and policy (e.g., see Handa 2009, or Walsh 2003).

The modern literature on credit rationing beginning with the seminal paper by Jaffee and Russell (1976) has identified the concept of credit rationing with economic behavior that causes an excess demand for credit at the going interest rate. Jaffee and Russell defined it as existing when a lender agrees to lend, but less than the amount desired by the borrower. Stiglitz and Weiss (1981) amended its definition to also recognize it as responsible for some prospective borrowers receiving loans while seemingly similar prospective borrowers do not. A key characteristic of credit rationing is that no offer to pay a higher interest rate by those denied credit induces lenders to change their minds, whereas an increase in available funds to the lender *might*.

The recognized causes of the rationing all stem from imperfect information in the credit markets. Jaffee and Russell (1976) explain credit rationing as a result of adverse selection, Stiglitz and Weiss (1981) explain it as a consequence of moral hazard in the credit markets, and Williamson (1986) shows how it arises when a lender needs to absorb the cost of monitoring the condition of a borrower to assure repayment.[3] In each of these three cases, an increase in the interest rate can make the loan less desirable to the lender. Interestingly, any one of these three types of imperfect information is sufficient to assure the existence of the credit channel.[4]

Presentations of credit rationing are not generally found in principles of macroeconomics textbooks[5] nor in the intermediate textbooks by Abel et al. (2008), Barro (2008), Blanchard (2009), Mankiw (2007), or Williamson (2008). Money and Banking textbooks by Ball (2009), Hubbard (2008), and Mishkin (2010) all introduce the concept[6] and briefly discuss how it arises from adverse selection and moral hazard problems. Other texts by Cecchetti (2008) and Miller and VanHoose (2006) do not mention it. As with the topic of the credit channel, more comprehensive discussions of imperfect information in the credit markets and credit rationing can be found in tomes on monetary economics such as Handa (2009) or Walsh (2003).

The Model

A lender's decision on whether or not to make a particular loan is modeled as dependant on the interaction between two sets of conditions: the lender's overall business strategy as determined by its financial situation and preferences, and, the lender's *perception* of the financial condition and overall creditworthiness of a prospective borrower. The specification of the lender's perception of the borrower's condition as opposed to the borrower's actual condition allows the model to reflect caution that the lender has due to imperfect information regarding the borrower as well as outright misperceptions of the borrower's condition. The following model recognizes these conditions while specifying two variables: the likelihood – as perceived by the lender – that the borrower will repay the loan (***L***, where ***L*** = 0 indicates the

[3] For thorough presentations of all three of these explanations of credit rationing, see Walsh (2003, pp. 326-336).

[4] As pointed out by Walsh (2003, pg. 326), credit rationing is sufficient, but not necessary for the credit channel to exist.

[5] An exception is Stiglitz and Walsh (2006) who present credit rationing briefly as an example of how imperfect information compromises the basic competitive market model (pg. 46).

[6] These authors' definitions of credit rationing vary slightly, e.g., Ball (2009) simply identifies it as a lender not agreeing to a loan regardless of the interest rate. Mishkin (2010) identifies lenders making smaller loans than desired by the borrower as a form of credit rationing.

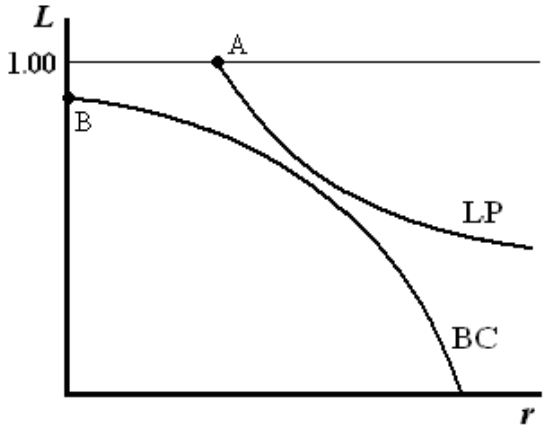
lender believes there is no chance that it will be repaid, and ***L*** = 1.00 means the payoff is believed to be certain), and, the interest rate on the loan (***r***).[7]

It is important to be clear that the ***r*** specified by the model is nothing more than the rate that would be charged on the single loan being considered by the model's lender, and is not a true market determined equilibrium interest rate. Although a "market interest rate" is referred to below, it is not a market determined equilibrium as much as it is an average of the interest rates on comparable loans witnessed in the recent past. However it is considered, the "market interest rate" in the following discussion is a good proxy for the lender's opportunity cost of making the loan and, accordingly, influences the specified lender's behavior and the determination of ***r***.

The model accounts for the lender's preferences in the face of different levels of ***L*** which, of course, correspond to different levels of perceived risk. More specifically, it specifies how the level of ***L*** affects the minimum ***r*** that the lender requires to willingly furnish a loan. This relationship between the two variables is represented by the **LP** curve in ***r*** **-** ***L*** space (e.g., see Figure 1).

To understand the **LP** curve, begin by considering the lender's perspective when ***L*** = 1.00 (shown as Point A on the **LP** curve in Figure 1). The lowest possible ***r*** required by a lender for making a loan with certain repayment is the return that the lender could receive from alternative, easily obtained riskless assets. This "risk-free rate" is commonly identified as the return on securities issued by the currency-issuing government. But it is not necessarily the case that the particular lender whose behavior is being modeled would willingly provide the riskless loan at that risk-free rate. One characteristic of lenders emphasized by the bank lending channel (as discussed in the previous section) is that a lender's access to loanable funds can vary with the lender's financial condition. A lender that is in a strong financial position and has funds readily available is more likely to agree to the risk-free rate and, therefore, Point A of the **LP** curve in Figure 1 would be directly above the risk-free rate. But it is also possible – particularly with smaller lending institutions – that the lender would not have easy access to funds and would require a higher ***r*** to induce the lender to make the loan, i.e., the lender would charge a risk-premium on top of the risk-free rate. In this case, Point A of the lender's **LP** curve in Figure 1 would be at an ***r*** greater than the risk-free rate.

Figure 1



As ***L*** falls from 1.00, the lender would need a greater risk-premium and, therefore, a greater ***r*** to be compensated for the lower probability of actually being repaid. This is captured by the negative slope of the **LP** curve (as seen in Figure 1). If the lender were to insist on the same expected rate of return [i.e., ***L***(1+***r***) – 1] regardless of the level of ***L***, then the **LP** curve would be a hyperbola within the range of ***L***=1 to ***L***=0. Even if the lender requires larger expected returns for lower levels of ***L***, the lender's **LP** curve would still tend to have the convex shape it possesses in Figure 1.

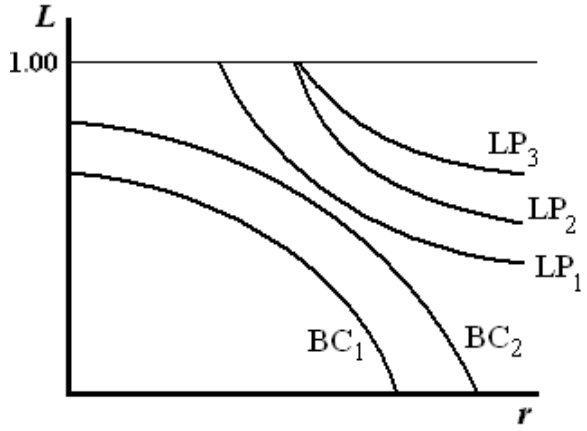
One factor determining the position of the lender's **LP** curve is the opportunity cost of making a loan, which is reflected by the return that the lender could receive on equally risky alternative assets.

[7] The interest rate (***r***) could be thought of as either a fixed rate or the initial rate on a variable rate loan because, as will be observed with the presentation of the model, changes in either would have the same qualitative impact on the lender's decision, as would also be the case for variable rate loans that designate a particular interest rate floor.

Accordingly, an increase in the market risk-free interest rate that the lender could receive on government securities would shift the point on the lender's **LP** curve corresponding with ***L*** = 1.00 to the right. Similar increases in the return on assets with a particular level of risk would increase the lender's opportunity cost of making loans of comparable risk, and would shift the point on the **LP** curve with a corresponding ***L*** to the right in the same way. Increases in the returns on alternative assets across all degrees of risk would shift the whole **LP** curve to the right (e.g., from $\mathbf{LP_1}$ to $\mathbf{LP_2}$ as shown in Figure 2).

Another factor influencing the **LP** curve is the lender's business strategy. For example, a reduction in the lender's tolerance for risk would move/pivot the **LP** curve to the right (e.g., from $\mathbf{LP_2}$ to $\mathbf{LP_3}$ as shown in Figure 2), i.e., greater levels of ***r*** needed to compensate the lender for reductions in ***L*** is captured by a flatter **LP** curve. Of course, the lender's financial condition in an important determinant of the lender's access to funds and, therefore, the exact location of the **LP** curve is also a function of lender's financial strength. A weaker condition would make obtaining funds to lend more difficult, which would be expected to shift the lender's **LP** curve to the right. It could also simultaneously flatten the curve (e.g., from $\mathbf{LP_2}$ to $\mathbf{LP_3}$ in Figure 2) for lenders that become more risk averse due to their weaker position. Whereas institutional differences that affect lending practices including differences between large and small banks are reflected in the positions and slopes of those lending institutions' LP curves, all lenders' curves would have the same general convex shape for the reasons described above which – as will be seen – is key to the model.

Figure 2



As was reviewed in the previous section, the bank lending channel component of the credit channel maintains that monetary policy influences output by affecting (primarily) smaller lenders' access to funds. This bank lending channel can be captured by shifts in the **LP** curve. For example, a contraction of the money supply that shifts out the **LP** curves of lenders by increasing the risk-free and other interest rates would also cause the **LP** curves of smaller lenders to shift further due to the bank lending channel's predicted increase in the difficulty of obtaining loanable funds by these lenders.

Not only does the model specify how the level of ***L*** affects the minimum ***r*** required to induce the lender to make the loan, it does so while simultaneously recognizing the credit rationing premise that the charged ***r*** affects ***L***. In other words, the model not only specifies ***r*** as function of ***L*** as represented by the **LP** curve, but also recognizes that ***L*** is a function of ***r***. This latter relationship is captured by the "**BC**" curve (also in ***r*** **-** ***L*** space) as depicted in Figure 1.

Consider the case in which no interest is charged on a loan (i.e., ***r*** = 0). If it was neither perfectly collateralized nor made to the currency-issuing government, then the loan would have a likelihood of repayment of less than 1.00 even with the zero rate. The lender's estimate of that ***L*** is represented by Point B in Figure 1. As ***r*** increases from zero, the level of ***L*** – from the perspective of the lender – decreases as argued by credit rationing theory, i.e., charging a larger ***r*** will engender adverse selection, moral hazard, and monitoring issues that decreases the lender's estimated likelihood that the loan will be repaid. The slope of the **BC** curve exhibits this negative relationship between ***r*** and ***L***.[8] Furthermore, progressively

[8] It is also the case that a larger ***r*** means greater debt service and, therefore, increases the likelihood that the borrower will end up defaulting on the loan. But this effect is normally not included in discussions of credit rationing.

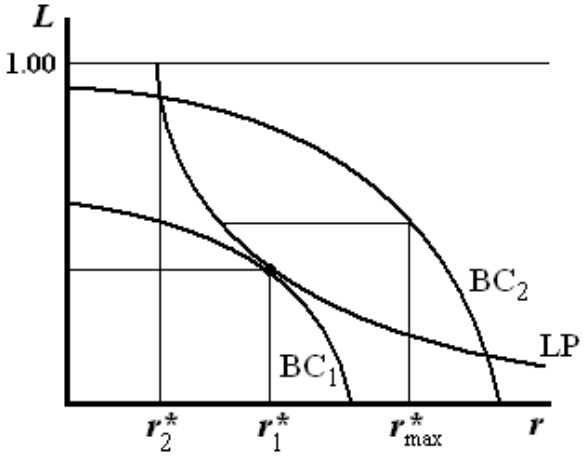
greater levels of ***r*** would likely cause ***L*** to fall at an increasing rate since a higher rate would trim the pool of willing borrowers to a riskier tail of their distribution. Therefore, as per the adverse selection explanation of credit rationing, increases in ***r*** would have an increasingly greater impact on ***L***. The accelerating level of risk would also cause ***L*** to fall at an increasing rate by credit rationing resulting from moral hazard. Accordingly, the **BC** curve is likely to have a concave shape (as in Figure 1).

Since the exact position of the **BC** curve depends on the lender's perception of the borrower's creditworthiness, one change that would shift the curve would be a change in the perceived expected future receipts to the borrower. For any borrower taken from the pool of willing borrowers, an increase in their expected future receipts would shift the **BC** curve up from $\mathbf{BC_1}$ to $\mathbf{BC_2}$ in Figure 2. Lower expected future obligations would affect the balance sheet and, therefore, move the **BC** curve in the same way. Other changes such as capital gains on the borrower's assets (including those offered as collateral) or reduced riskiness of the borrower's assets and/or liabilities would also make the borrower more attractive and cause a similar upward shift in the **BC** curve.[9] It is also possible that reducing the loan amount could increase the perceived likelihood that it will be repaid and, therefore, shift the **BC** curve upward.

The balance sheet channel component of the credit channel – as reviewed in the previous section – maintains that monetary policy influences output by altering interest rates that, in turn, affect the balance sheets of prospective borrowers. For example, contractionary monetary policy that raises market interest rates will reduce the value of assets, possibly increase debt-service requirements on previously issued debt, and reduce the present value of future cash receipts. All of these make a prospective borrower appear less creditworthy and, therefore, shift the **BC** curve down. Thus, the **BC** curve is sensitive to those shocks that affect lending via the balance sheet channel.[10]

Having specified the **LP** and **BC** curves, the model's prediction of the lender's decision concerning the loan is straightforward. Figure 1 depicts a situation where any ***r*** the lender might charge brings about too low of ***L*** for the loan to be viable in the eyes of the lender, and no loan will be made. The fact that there is no increase in the interest rate that would persuade the lender to make the loan captures a defining feature of credit rationing. Figure 3 portrays **LP** and **BC** curves (i.e., **LP** and $\mathbf{BC_1}$) that are tangent at a single point, which indicates that the lender would willingly provide the desired loan at the ***r*** identified by the

Figure 3



[9] The common assumption that a higher level of collateral improves a lender's position has been questioned by Guiso (1998) who argues that the opposite can be true since firms with more marketable wealth (and, therefore, have more available collateral) can be prone to taking greater risks. Since the **BC** curve represents the lender's perception of the likelihood of repayment by the borrower, the effect of greater collateral on the **BC** curve would depend on how it is interpreted by the lender.

[10] Other important changes that would normally affect the prospective borrower's balance sheet and shift the **BC** curve would be aggregate demand and aggregate supply shocks, since the perceived financial health of a borrower is usually sensitive to the overall level of activity in the economy. For example, a recession can harm a prospective borrower's financial situation by reducing current and/or expected receipts and shift the **BC** curved down. Similarly, an increase in perceived systemic risk would be reflected by a downward shift in the **BC** curve. Yet another type of change altering the **BC** curve would be changes in tax policies and bankruptcy laws that affect the borrower's potential obligations: An investment tax credit that reduces the effective tax liabilities of the borrower/investor would increase ***L*** for every possible ***r***, shifting the **BC** curve up.

intersection of the two curves (i.e., r^*_1). Note that a shock shifting either the **LP** curve out (e.g., a decrease in the lender's access to funds) or the **BC** curve down (e.g., the value of the borrower's assets falls) would switch the lender's decision from agreeing to the loan at r^*_1 to completely rejecting the loan at any r.

Overlapping **LP** and **BC** curves (as is the case with **LP** and $\mathbf{BC_2}$ in Figure 3) predicts that the loan will be made, however, the interest rate that will be ultimately negotiated on the loan depends on the market power of the lender relative to that of the borrower. If one assumes that the borrower has no alternative source of credit, then the lender possesses significant market power and will tend to choose the r that maximizes expected profits. This would be achieved by the rate that offers the lender the highest premium above the least amount required by the lender to make the loan. This rate (r_{MAX}) can be found in Figure 3 where the horizontal width between the **LP** and $\mathbf{BC_2}$ curves is maximized.

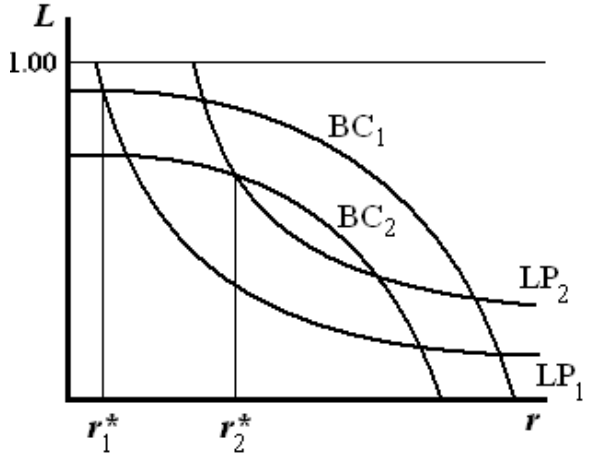
However, competition in the lending market would cause lenders to accept a lower r. The lowest r that a competing lender would accept is found at the intersection of the **LP** and **BC** curves with the lowest r (i.e., r^*_2 in the case of **LP** and $\mathbf{BC_2}$ in Figure 3). Although it is conceivable that varying degrees of market power possessed by the lender as well as the borrower might lead to the two parties agreeing to an interest rate falling somewhere between r_{MAX} and r^*_2, the following analysis will assume that the lending markets are sufficiently competitive such that the lender agrees to make the loan at the lower rate.

The model adroitly captures the effects of different types of shocks on a lender's behavior. For example, consider the effect of an improvement in the financial condition of the prospective borrower, perhaps due to an appreciation of the borrower's assets. The change shifts the **BC** curve up (e.g., moving from $\mathbf{BC_1}$ to $\mathbf{BC_2}$ in Figure 3) providing a lower r^* (from r^*_1 to r^*_2 in Figure 3) reflecting the lender's willingness to lend at a lower rate due to the ameliorated financial condition of the borrower. An alternative type of shock would be a decrease in the lender's tolerance for risk that causes the **LP** curve to flatten in the same way as was depicted in Figure 2 (as a shift from $\mathbf{LP_2}$ to $\mathbf{LP_3}$). If the loan would have been agreeable to the lender before the reduced tolerance, then the change causes the interest rate charged on the loan to increase as the intersection of the new **LP** curve and the **BC** curves would be at a higher r *unless* the movement of the LP curve is enough so that the **LP** and **BC** curves no longer intersect, in which case the loan would no longer be made.

The model also captures credit rationing in the form of lending less than the amount desired by the borrower. The perceived **BC** curve based on lending the full amount does not reach the **LP** curve at any interest rate and the loan is denied by the lender. But reducing the loan amount is thought to improve the borrower's condition and shift the **BC** curve up, making it agreeable to the lender.

Now consider the model's interpretation of the effects of contractionary monetary policy as depicted in Figure 4. The increase in returns on substitutable assets increases the lender's opportunity cost of making a loan that shifts the **LP** curve to the right. The existence of bank lending channel effects would make it more difficult to obtain funds to lend – particularly for smaller lenders – which would add to the shift in the **LP** curve (from $\mathbf{LP_1}$ to $\mathbf{LP_2}$ in Figure 4). Furthermore, the increase in the market interest rates would reduce the value of assets and possibly increase the debt-service requirements on existing debt, both of which would

Figure 4



be detrimental to the balance sheet of a prospective borrower. Thus, the balance sheet effect shifts the **BC** curve down from $\mathbf{BC_1}$ to $\mathbf{BC_2}$.

While Figure 4 shows the effect of these monetary policy-induced shifts in the **LP** and **BC** that cause r^* to rise from r^*_1 to r^*_2 in the case when the loan is still made by a competing lender, it is possible that the combination of shifts in the **LP** and **BC** curves would be sufficiently great for many lender/borrower relationships that the two curves would no longer intersect and the loan would no longer be viable at any r. The macroeconomic effect of the contractionary monetary policy would depend on the share of the lending decisions in the economy in which the policy-induced shifts in **LP** and **BC** curves would be sufficiently large to prevent the respective loans from being made. The greater that share, the more of an impact the contractionary policy would have via the credit channel on aggregate investment, consumption, and, therefore, output.

Finally, it is important to note that while the negative slope of the **BC** curve captures the lender's credit rationing perspective, any resulting quantity rationing of credit predicted by the model would be independent of the standard (i.e., price) rationing of credit through the interest rate. In particular, higher interest rates would reduce the amount of lending by decreasing the number of willing borrowers.

Summary and Conclusion

This paper has introduced a model of lender behavior that effectively accounts for credit rationing as well as other aspects of the lending decision that give rise to the credit channel of the monetary transmission mechanism. The model's presentation of a loan decision effectively differentiates between factors influencing the credit channel's bank lending channel (that affect the model's **LP** curve) and those factors having an impact through the credit channel's balance sheet channel (that move its **BC** curve). It is hoped that the simple model will facilitate and encourage more comprehensive presentations of the credit channel and credit rationing to undergraduate economics students. The Fed's recent elevated role in overseeing credit markets recommends increasing the profile of the credit channel in the undergraduate curriculum, and the sub-prime mortgage crisis provides the latest evidence that the ever increasing sophistication of the financial markets does not overcome the importance of lenders rationing credit as they traditionally have.

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