

Credit Rationing: Reply

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John Riley has made "A Further Remark" on Section IV, "Observationally Distinguishable Borrowers," of our 1981 paper in this *Review*. In that paper, we defined two types of rationing. Criterion *a* rationing occurs when, among observationally identical borrowers, some get loans and others do not, and the rationed borrowers cannot get credit at any interest rate. A second type of rationing (criterion *b* rationing) occurs when entire types cannot get credit at any interest rate, although they would get credit if the supply of funds were sufficiently large. This type of rationing is often termed "red-lining." We showed that, given the special simplifying assumptions of our model and disregarding the incentive effects of loan contracts, if there are many types of observationally distinguishable borrowers, only one type is subject to criterion *a* rationing. Riley goes on to conclude that rationing becomes of insignificant importance as the number of observationally distinct groups becomes large. More specifically, the conclusion that one might be tempted to draw from Section IV of the 1981 paper is that "Given the special simplifying assumptions of the paper, and ignoring the incentive effects of interest rates delineated in the paper, as the number of observationally distinct groups increases, the proportion of the population subject to criterion *a* rationing decreases, while the proportion subject to criterion *b* rationing decreases or increases depending on how the population is partitioned."

We did not include this conclusion (or even a less verbose version) in that paper, because we feared it might mislead readers in either of two ways. First, the reader might not have been aware that the conclusion is very sensitive to the special assumptions of

the adverse-selection sections of our 1981 paper.

By the time we published our 1981 paper, our research extending that model, for example, to multiperiod settings and to situations where collateral and interest rates were both employed, had made it amply clear that the conclusion that type *a* rationing disappeared in importance as the number of types in the economy increased was not, in fact, generally valid.¹

Second, even within the special context of those special simplifying assumptions, the conclusions would mislead a reader who was not aware that criterion *b* rationing (red-lining) has consequences for allocative efficiency and macroeconomic policy that are as important as the consequences of criterion *a* rationing.

We are not so presumptuous as to believe that the assumptions we made in our 1981 paper should be interpreted as a literal description of the economy. Those assumptions were made to provide the simplest model in which the market equilibrium would be characterized by credit rationing. If one is interested (as we are) in understanding the importance of rationing in the economy, as opposed to its importance within a specific model, one should investigate the nature of rationing in more general models that are formulated to more closely resemble the actual economy.

This we have done in a series of papers, which show that with many observationally distinguishable groups there may be rationing of several, or even of *all* groups. For

¹Indeed, it seemed to us transparent that even within the simpler model, the conclusion need not be valid. Assume there were some characteristic (say wealth), such that the probability distribution of returns, conditioned on that variable, did not in fact depend on that variable. Then, of course, having a finer partition of the population according to that characteristic will leave the magnitude of credit rationing unchanged.

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instance, in our 1983 paper, we allowed banks and borrowers to develop multiperiod relationships. We showed that, even in the simplest dynamic model, the market equilibrium could involve rationing of both experienced and inexperienced borrowers. Rationed and nonrationed experienced borrowers were identical (differences in the results of their previous projects were due to chance), as were all inexperienced borrowers. In that dynamic model, rationing of experienced borrowers affects the choice of techniques by inexperienced borrowers. This is why both types are rationed.

In Carl Shapiro-Stiglitz (1984), unemployment of workers has similar incentive effects. In equilibrium, each type of worker has a finite probability of being unemployed. Again, this is true regardless of the number of observationally distinguishable groups in the population. Unemployment rates differ across types of workers.

In our 1985 paper, we generalized our static model to allow banks to choose simultaneously interest rates, and collateral and equity requirements. We also allowed contracts to have both sorting and incentive effects.² In that analysis we showed that every type of borrower could be rationed. As in the closely related work in the labor market by Stiglitz (1976), J. L. Guasch and Weiss (1980), and Barry Nalebuff and Stiglitz (1982), rationing plays a role in sorting individuals and, at the same time, is a consequence of the sorting and incentive effects of *all* the terms of the contract. The proportion of rationed borrowers does not become insignificant as the number of groups in the population increases. In our 1985 paper, pervasive rationing is possible in either a pure

²A number of writers have constructed special examples where credit rationing does not arise. When we wrote our 1985 paper, we were well aware that an infinite number of examples can be constructed in which credit rationing does not occur. However, these examples do not vitiate our result that credit markets may be characterized by rationing. We never asserted that credit markets are always characterized by credit rationing. Much of our recent research focused on understanding the necessary and sufficient conditions for there to be rationing in credit markets and unemployment in labor markets.

pooling equilibrium, in which all borrowers choose the same contracts, or in a (partial) separating equilibrium, in which the number of contracts is equal to the number of types of borrowers and there is rationing at *every* contract.

To rephrase our earlier point, we do not believe it is very interesting to explore all the ramifications of the simplifying assumptions of our 1981 paper. Rather we believe attention should be focused on understanding the robustness of the conclusions of that model when the basic assumptions are relaxed.

In investigating these questions, one must be careful to bear in mind the central economic issues. Thus, in our 1981 paper, there was only a single information problem, either adverse selection or moral hazard: and if there was an adverse-selection problem, individuals differed in only one respect. For this simple model, it may be possible to give the lender additional instruments, with which it can completely "solve" the informational problem without engaging in rationing. But these results provide insight only into the simplifying assumption of the model, not into the economy. In actual markets, lenders never have perfect information about the characteristics of their borrowers and can never perfectly monitor their actions. Our papers have shown that under these circumstances, credit rationing is likely to persist regardless of the number of observationally distinct groups.³

However, even if the specific simplifying assumptions of our 1981 paper were taken as literal descriptions of the economy, Riley's conclusions are misleading for four reasons.

First, we do not believe that the theoretical force of rationing models depends on *identical* workers being treated differently. As the number of types of borrowers increases, *nearly* identical individuals are treated differently. In the polar case of a

³We are assuming that the partition of workers into more types does not eliminate problems arising from unobserved differences across borrowers and incentive effects of contracts. We believe that models in which lenders are perfectly informed concerning all the actions of each borrower are not useful for examining problems that arise due to informational asymmetries.

continuum of types of borrowers, we would find *types* of borrowers that were excluded from the credit market, though their characteristics are arbitrarily close to those of types that are getting credit. (The metric of closeness needs to be suitably defined for the economy in question.) The expected utility of types of borrowers that are excluded from the credit market is discretely lower than the expected utility of borrowers with almost identical characteristics that are not excluded.⁴ Increasing the number of types of borrowers, while maintaining unobserved heterogeneity within each type, does not, in general, affect the magnitude of this problem.

Second, the proportion of borrowers who are excluded from the market—borrowers who cannot obtain loans at any interest rate even though with a larger supply of credit they would—does not necessarily change with increases in the number of types. One of the purposes of our 1981 paper was to explain this type of rationing (red-lining).

Third, we suggested in the 1981 paper that the rationing equilibria would not, in general, be Pareto efficient. The expected return of the projects of the excluded groups might exceed that of groups obtaining loans. This conclusion remains valid, even as we increase the number of types of borrowers.

Finally, Riley is incorrect in asserting that the qualitative effects of monetary policy are the same in our models as in the standard models.

One of the primary reasons for our interest in rationing equilibria is that they provide an alternative mechanism through which monetary policy may affect the level of economic activity. Though in our paper we did not have time to trace the link between actions of the monetary authority and the availability of credit (see our 1980 paper, or Alan Blinder-Stiglitz, 1983), we were concerned with how credit availability affected the level of economic activity. We stressed

⁴By contrast, in the standard economic models, even when there are nonconvexities which result in discretely different allocations for similar types of individuals, the levels of utility are not discretely different.

that it was *not* through the standard Keynesian procedure, where an increase in the supply of funds leads to a decrease in the rate of interest, which, in turn, leads to an increase in the demand for investment.

With credit rationing, an increase in the supply of funds has a direct effect, providing loans to applicants who were previously denied credit (at *any* interest rate). In particular, changes in the availability of credit affects the distribution of types of borrowers getting credit. Consequently, an outward shift in the supply of loanable funds could cause an increase in the average interest rate charged borrowers. This explains why observations on the average interest rate charged borrowers may not be helpful in determining whether monetary policy is being expansionary or contractionary.⁵ These conclusions of our analysis also remain valid, regardless of the number of types of borrowers.⁶

We concluded our 1981 paper by saying:

The Law of Supply and Demand is not in fact a law, nor should it be viewed as an assumption needed for competitive analysis. It is rather a result generated by the underlying assumptions that prices have neither sorting nor incentive effects. The usual result of economic theorizing: that prices clear markets, is model specific and is not a general property of markets—unemployment and credit rationing are not phantasms. [p. 409]

We still believe that. The objective of that paper was to construct the simplest model in which these phenomena could be explained as arising out of information imperfections

⁵These problems are compounded by the fact that changes in the economic environment which lead monetary authorities to undertake expansion or contractionary actions may also lead to changes in the relationship between the expected return to the bank and the interest rate charged; leading in turn to changes in the interest rates which would be charged, at any given loan supply.

⁶Though the mechanism by which the availability of credit affects the level of investment is different from that of the standard model, it is true that an increase in the availability of credit will decrease the expected return to depositors, as in the standard model.

which we believe to be pervasive in these markets. Our subsequent research has established that the conclusion is, if anything, even more robust than we had originally thought.

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