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Notes on "The Role of Demandable Debt ..."
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From Diamond and Dybvig ("DD"), we know that demandable debt can have costly consequencs, through maturity mismatch and bank runs. In order to protect against bank failure when there is an aggregate uncertainty it becomes necessary to hold unproductive reserves. This makes it look like demandable debt would be inferior to some arrangement with better maturity matching, or arrangements in which lenders hold equity contracts.

The approach in Calomiris and Kahn (CK) is to focus on demandable debt as an incentive arrangement to promote good behavior by the banker. In their framework early withdrawal becomes a way of paying depositors for monitoring the banker's behavior.

While it is the case that a sequential service constraint is part of a demandable debt arrangement, it still seems to be an odd provision from the point of view of optimal contracting. Giving preferential treatment to the person who gets there first harms risk sharing. Contrast the arrangement with the typical arrangements of bankruptcy, in which lenders with identical financial instruments are treated identically (indeed, if a lender somehow manages to get his money just before the bankruptcy is declared, it may be pulled back into the bankruptcy proceedings.)

On the other hand it makes sense to have a first-come-first-served rule if you want to encourage depositors to make quick responses. In other words, CK argue that the fragility of the demandable debt arrangement is not an accident, but a guarantee of intense surveillance, one which reduces the cost of capital to the banker.

For DD, the point of demandable debt is liquidity provision, and bank runs are an unfortunate side effect. The problem with that view is that the liquidity could be achieved without liquidating the bank—allow the depositors to pass their holdings in the bank on to another party, without requiring the bank be liquidated to do so. Indeed such an arrangement, the "post-dated note," was a feasible alternative to demand deposits, but one which never achieved dominance.

The DD approach has other difficulties in matching up with actual banking experience:

Their proposed solution to the bank run, "suspension of convertibility," does not look like actual historical suspension of convertibility. No individual bank was ever permitted unilaterally to declare that it would not redeem demandable debt. Such suspension was only carried out by the government, or occasionally, by the group of all banks in a community. In this respect the "bank" in DD might be better thought of as the banking system as a whole.

In DD, bank runs occur when suddenly everybody is hungry at once. In the case of idiosyncratic demand for liquidity, however, a bank has ready recourse to borrowing from other financial institutions. Historically, runs occur when there is good reason to fear that the bank's assets are of questionable quality. That is, when there is a run on the bank, it is the case, more often than not, that the informed depositors know that the bank is in trouble, and other institutions are not willing to provide the financing. Indeed fraudulent behavior by the management of the failing bank is historically an important component of bank runs.

CK conclude that the point of a bankrun is to take control of the bank away from the banker. For them a demandable debt contract is a three-sided arrangement, between the bank, informed depositors ("monitors"), and uninformed depositors ("non-monitors"). Monitors pay the cost of vigilance but are first in line in case of failure. Non-monitors lose if bad outcome occurs, but still benefit since the arrangement keeps the banker honest, making failure less likely. The guarantee on his behavior allows the banker gto obtain funds more cheaply.

(Note therefore that the arrangement solves the Grossman-Stiglitz problem: if prices incorporate all information about an asset, who would be willing to put in the effort to learn about an asset's value in the first place. The demandable debt arrangement automatically rewards investments in monitoring.)

The Model:

All agents are risk neutral. A bank has access to a project but no funds, depositors have funds but could only receive a gross return of S on their own.

1) a monopolist bank with access to an investment project with two possible realizations of profitability
2) the banker can "abscond" (expost behavior which is socially distructive. An extension considers ex ante moral hazard). Absconding reduces the output by a proportion A, so that ATi is what is available for the banker.
3) different depositors face different costs of predicting profitability
4) an authority which enforces contracts and acts as receiver for bankrupt firms
5) depositors have a reservation value below which they will not invest.
6) the bank can be liquidated. This reduces the output by a proportion L (to LTi) but it also precludes the banker's absconding. If liquidation occurs the most depositors can receive is M.

The timing is as follows:

In period 0 contracts are written and funds raised.
In period 1 a depositor can invest in a signal
In period 2 the bank may be liquidated
In period 3 the loan is repaid unless the banker absconds

The contract in period zero specifies the payment to be made and the liquidation decision as a function of a depositor announcements. It is assumed that equity contracts are not possible, because the realization of the outcome is known only to the banker.

The Single Depositor Case

In the simplest version, the authors consider a single depositor, and 1 dollar to invest. The two investment outcomes are T2 and T1, with T2 > T1. The probability of a high outcome is denoted by γ. The cost to the depositor of monitoring is I.

A promise to pay the amount P is in effect an option for the banker either to pay or to abscond. There is a greater temptation to abscond at low values Ti. The banker in effect compares the "tax" (1 - A)Ti (note there is a typo at this point in the paper!) with the payment due depositor. (As is common in models of lending with agency problems, the default premium necessary in the terms of the contract can increase the likelihood for default.)

Parameter restrictions:

L > A: liquidation less wasteful socially than absconding.

AT2 > M > AT1 (In other words, from the point of view of the depositor, liquidation is potentially useful in the bad state, but not in the good state)

If the depositor monitors, he receives a bi-valued signal: σ in {g,b} with the probability of the high realization being ρ_σ.

$\rho_g > \gamma > \rho_b$

Results:

For some parameter values, the best contract is an arrangement in which the depositor chooses liquidation if the signal is b and no liquidation if the signal is g.
Provided the signal is sufficiently cheap and and sufficiently accurate and the opportunity cost of the depositor's funds S is sufficiently high the contract looks like demandable debt.

Extension to multiple depositors

The model of this section is unaesthetic in the extreme; in effect it is designed simply to give an example in which optimality of demandable debt arises.

In this version, depositors' signals are i.i.d. draws conditional on the true outcome of the bank's investment.

CK introduce reserves as a way of handling the possiblity that different agents get different signals. In effect the reserves are a "trip-wire." If too many depositors get a bad signal, their withdrawals exhaust reserves and the bank is liquidated.

So from the point of view of the banker, assuming that the depositors monitor and react as they are supposed to, all that matters is the aggregate behavior: the number of individuals who receive a bad signal. Given the liquidation probabilities, the banker's problem is unchanged from the single depositor case.

From the point of view of the mechanism designer there are some degrees of freedom in the arrangement; CK set it up such that depositors who monitor and see a good signal behave the same as depositors who do not monitor. These individuals receive equal shares of whatever is left in the bank. Depositors who choose to withdraw receive a fixed amount R. Most of the work in this section is simply bookkeeping: tracking the amount left in the bank under various realizations of good and bad draws so as to ensure that low cost monitors have an incentive to invest in monitoring and to report truthfully.

Extensions

The model explains why debt is demandable. Note that this is distinguished from making the debt transactable: in the model there is no need for depositors to trade their debt—indeed it could be a disadvantage to do so since it would make it less likely that they monitor and run the bank when needed. (Kahn and Roberds consider an extension along these lines). CK that demandability is the key feature: post-dated notes are transactable but not demandable. They also argue that demandability in ancient times preceeded transactability.

On the other hand, demandable debt becomes more liquid by the fact that everybody can redeem it. The fact that the bank is open becomes the way that uninformed individuals trust in the quality of the debt as payment. In this way CK becomes an extension of Gorton-Pennacchi.

In DD deposit insurance improves the demandable debt contract. In CK it ruins it, for it removes the incentive for informed agents to monitor. Does this mean that the structure is irrelevant now that deposit insurance is universal? Not necessarily. The modern day equivalent of demandable debt is short term subordinated debt held by other financial institutions: in effect nowadays other banks are the informed monitors and precipitate bank runs to bring down troubled institutions.