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## Reducing Moral Hazard at the Expense of Market Discipline

### The Effectiveness of Double Liability before and during the Great Depression

BY Haelim Anderson, Federal Deposit Insurance Corporation; Daniel Barth, Office of Financial Research; and Dong Beom Choi, Seoul National University

The size and severity of the 2008 financial crisis have been tied to excessive risk taking by banks, which was enabled by the poor incentives that arise under limited liability and public deposit guarantees. Under limited (single) liability, bank shareholders may take excessive risks because they receive all upside gains from risky projects, but their downside exposure is limited. The provision of deposit insurance further encourages risk taking by banks because it decreases depositors' incentives to monitor and constrain bank risk. Policymakers have responded to this moral hazard problem in financial intermediation by imposing regulatory and supervisory requirements designed to induce prudent bank investments.

When the crisis subsided, attention turned to financial regulatory reforms. Measures were introduced to reduce systemic vulnerability. This was partly because of the substantial increase in safety nets implemented during the crisis, which could make the financial system more prone to future crises. Yet the debate over what interventions are appropriate continues because current reform efforts do not fully address the fundamental moral hazard problem.

Several economists and policy organizations have advocated achieving financial stability through alternative policies focused on bank incentives rather than through heightened regulatory and supervisory controls.

One such proposal is to increase shareholder liability, which will directly restrain their incentives to take excessive risks. This is not a new idea. Prior to the Great Depression, regulators imposed double liability on bank shareholders to mitigate excessive bank risks, reduce the probability of bank failures, and in turn enhance the safety of deposits. Under double liability, if a bank fails and closes with negative net worth, shareholders can be forced to pay an assessment up to the par value of the stock to compensate depositors and other creditors.

However, the literature provides mixed evidence on whether double liability succeeds in constraining banks' risk taking. While some studies generally argue that double liability discourages banks from risk taking, others find empirical evidence of more risk under double liability. For instance, Jonathan Macey and Geoffrey Miller show that banks with double liability appear to be able to operate with lower capital ratios than banks without double liability. One potential

source of this inconsistency is that empirical tests examining the effects of double liability on banks' risk taking are fraught with challenges. For example, an important but often overlooked confounding factor is the endogenous response of depositors. Double liability not only increases shareholders' skin in the game but also decreases depositors' incentives to monitor banks, because better-protected depositors have less incentives to curb banks' risk-taking behavior and ensure the safety of their deposits.

We study the effect of double liability on banks' risk taking. We begin by providing a simple model that characterizes two competing effects of double liability on banks' risk taking. The first is a reduction in moral hazard that results from shareholders' increased skin in the game. However, double liability also reduces the market discipline of depositors, who benefit from the enhanced safety of their deposits. All else equal, this weakened market discipline may actually promote banks' risk taking.

Our model analyzes the effect of liability structure on excessive risk taking in the presence of potential deposit withdrawals (i.e., bank runs). If depositors monitor their banks and react to negative information by withdrawing funds, banks are incentivized to avoid excessive risks. But depositors have fewer incentives to respond to negative information if deposits are protected from losses. Double liability, therefore, makes deposits "stickier," weakening market discipline and potentially increasing bank risk. The model predicts that although double liability unambiguously makes deposits stickier when negative information is revealed (i.e., less *ex post* deposit outflow), its overall effect on *ex ante* risk taking is unclear. To our knowledge, this tradeoff between the direct effect of reduced risk taking and the indirect effect of weaker market discipline has not been explored in the literature.

This theoretical ambiguity suggests that the relationship between double liability and banks' risk taking is ultimately an empirical question. However, obtaining credible estimates of this effect is challenging because differences in local economic conditions, regulation, supervision, and other unobservable characteristics all pose threats to inference. To overcome these issues, we use a novel identification strategy based on the unique regulatory environment in the United States prior to the Great Depression.

Ideally, we would like to compare banks that simultaneously face identical regulatory requirements (e.g., capital and reserve requirements and branching restrictions), identical supervisory agencies, and identical local economic conditions, but different liability rules. To achieve this, our identification strategy is to compare national banks

with state Federal Reserve member banks (Fed member) in neighboring states within the same Federal Reserve district (in this case, the Second District) but with different liability rules. While all national banks operated under double liability throughout the 1920s and early 1930s, state banks operated under the liability rules of the state. Specifically, our identification strategy exploits the fact that state banks operated under double liability in New York but under single (limited) liability in New Jersey.

We construct semiannual bank balance sheet data on national and state Fed-member banks from December 31, 1925, to December 31, 1932, in New York and New Jersey, spanning the boom and bust cycles of the Great Depression. Using bank-level balance sheet data from a historical period attenuates biases that arise when using modern institutional balance sheet data, because the unit banking system ensured that banks in the same local market likely had similar business models and faced similar demand. We augment this data with deposit rate information from national bank examination reports and state bank reports. This allows us to examine depositors' behavior through price as well as quantity.

Our empirical analysis begins by comparing the risk-taking behavior of single- and double-liability banks. We examine banks' ratios of cash to assets and equity to assets, broadly conceived as measures of liquidity and capital buffers, for the expansion period of December 1925 to June 1929. We find no statistically significant differences between single- and double-liability banks before the Great Depression. In fact, our point estimates, although not statistically significant, indicate that double-liability banks had fewer liquidity and capital buffers than single-liability banks. These results suggest that double liability did not lead to a reduction in risk taking along these two dimensions.

Next, we examine deposit outflows during the Great Depression to test whether deposits in double-liability banks were stickier than in single-liability banks, conditional on banks' risk characteristics. Our empirical results indicate that single-liability banks faced a deposit outflow that was 2.75 percentage points larger on average per six months than double-liability banks during the Great Depression. This estimate is statistically significant and economically large compared to the median deposit growth rate of -2.79 percent over the same period. Results from a linear probability model also indicate that single-liability banks were nearly 8 percent more likely to experience a net deposit outflow during the Great Depression. Conversely, we find no evidence of a relationship between double liability and deposit growth rates during the boom period, when the risk of bank failure was low.

We also examine deposit rates for national and state Fed members in New Jersey for years 1925, 1927, 1929, and 1931. We show that single-liability banks offered higher deposit rates throughout the entire period, suggesting the depositors required a risk premium from single-liability banks to compensate for the lack of protection for their deposits. We also show that real deposit rates were high and increasing for both national and state Fed-member banks during the Great Depression. This suggests that deposit outflows in the banking sector were not driven by banks' desire to induce deposit outflows by offering lower rates. Lastly, we find that single-liability banks actually increased deposit rates by more (in real terms) during the Great Depression, even though they experienced greater outflows. This suggests that our finding that single-liability banks experienced greater outflows is driven by depositors' decisions to withdraw rather than banks' decisions to induce deposit outflows.

Our findings imply that double liability failed to resolve the agency problem because of the conflict between shareholder incentive alignment and depositor market discipline. By requiring shareholders to have more skin in the game and thereby enhancing the safety of deposits, double liability changed the incentives of both shareholders and depositors.

In other words, double liability became less effective at inducing prudential risk taking because of its indirect, offsetting effect of weaker market discipline.

Our results are relevant for current policy discussions. Following the recent financial crisis, regulators introduced various measures to increase liability, including bail-in, contingent convertible bonds, and clawback provisions. These policies can affect the distribution of liability between shareholders and creditors in the event of a bank failure by shifting losses from certain creditors to shareholders. Our findings suggest that while such policies may improve shareholder incentive alignment, they may also affect the monitoring incentives of creditors.

**NOTE:**

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