The Explicit Costs of Government Deposit Insurance

Thomas L. Hogan and William J. Luther

The Diamond-Dybvig (DD) model is often cited as a theoretical justification for government deposit insurance. In the model, rational agents find it in their interest to withdraw their bank deposits if they suspect other depositors plan to do likewise. When a sufficient number of agents are expected to liquidate their accounts, a bank run ensues. Guaranteeing deposits through a system of government-administered deposit insurance removes the temptation to run on the bank and thereby precludes the need to ever use the deposit insurance. As Thomas Sargent makes clear, deposit insurance enters the model as a costless solution:

> The good news in the Diamond-Dybvig model . . . is that if you put in government-supplied deposit insurance, that knocks out the bad equilibrium. People don't initiate bank runs because they trust that their deposits are safely insured. And a great thing is that it ends up not costing the government anything to offer the deposit insurance! It's just good all the way around [Rolnick 2010: 31].

Diamond and Dybvig (1983: 44) conclude, "Government deposit insurance can improve on the best allocations that private markets provide."

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In practice, however, government-provided deposit insurance is not a costless solution. It is frequently invoked to cover the losses of failed banks. In the United States, deposit insurance provided by the Federal Deposit Insurance Corporation (FDIC) is administered as a "rainy-day fund." Each member bank pays a premium based on its risk rating and on the amount of insurable deposits held by the bank. Premiums are held in a deposit insurance fund (DIF) administered by the FDIC. When a member bank becomes insolvent, debts to its depositors are paid out of the DIF and premiums for all banks increase until the fund is restored. Annual premiums reflect the cost of operating and administering the system and recent losses due to bank failures. The cost of guaranteeing deposits through such a system is decidedly nonzero.

The costs of providing insurance are sufficiently high as to warrant their inclusion in any reasonable model of deposit insurance. If the corresponding benefits of deposit insurance were sufficiently large and the alternative means of acquiring these benefits were either nonexistent or sufficiently costly, then ignoring the real-world costs of government-provided deposit insurance is perhaps appropriate. However, we do not believe this is the case. The benefits are not so large that one need not be concerned with costs, and there are potentially superior alternatives to government-provided deposit insurance. If one is to consider alternatives by engaging in comparative institutional analysis, a better understanding of the costs of government deposit insurance is required.

In what follows, we explore the explicit costs of government-provided deposit insurance. We focus on the FDIC as a specific example. First, we review the DD model and show how FDIC deposit insurance differs from the model in several key respects. Second, we discuss the history of the FDIC, paying particular attention to how the maximum amount covered, number of bank failures, and cost of managing the deposit insurance fund have changed over time. Third, we briefly discuss private deposit insurance and other risk-constraining mechanisms as alternatives to government-provided insurance. Finally, we offer some concluding remarks.

Theory of Deposit Insurance

The DD model demonstrates that although banks can reduce individual risk by acting as financial intermediaries, they create

systemic risk in the potential for bank runs. Under certain conditions, financial contagion can cause all banks, even solvent ones, to be run upon simultaneously. Diamond and Dybvig (1983) propose that government insurance can costlessly limit the risk of bank runs by guaranteeing the values of customer deposits. Here we review the DD model to demonstrate how deposit insurance under FDIC differs from that posited by Diamond and Dybvig.

Banks in the DD model provide insurance against some form of uncertainty about the future. Suppose there is a group of agents with only one type of opportunity for production over three periods 0, 1, and 2. For each unit of capital invested in the production process in period 0, any agent can earn a return of $R > 1$ in period 2 or withdraw his original investment of 1 unit in period 1. Many analogies have been used for this scenario: planting corn that grows in the future but provides a meager yield if harvested early (Selgin 1993); a business project where investors' time horizon is uncertain (Diamond 2007); a real estate fund that may be relinquished early at a discount or held to maturity (Sebastian and Tyrell 2006). The asymmetry of future payments in each of these cases makes their payoff patterns suboptimal. Because the agents invested in these technologies tend to be (or at least are assumed to be) risk averse, they would prefer to accept a reduction of their high potential payment in period 2 in return for a small increase in their potential payment in period 1.

A bank can be created to reduce the cost of uncertainty by smoothing the potential future payoffs. Agents that invest in the bank receive a deposit contract that allows them to choose between future payoffs of return r_1 in period 1 or r_2 in period 2 where $1 < r_1 < r_2 < R$. However, the bank uses the same production technology as agents in the economy. In period 1 it has only 1 unit of capital per deposit contract but has promised each agent $r_1 > 1$. If too many agents redeem their deposits in period 1, the bank will not have sufficient capital to fulfill its obligations, and the bank will go into default. Once it becomes known that the bank may default, all agents have an incentive to redeem their deposits immediately in period 1 since no capital will be left in period 2. This flood of simultaneous redemptions constitutes a bank run. The danger of bank runs is most poignant when consumer preferences are unknown. Because each agent fears that the others may withdraw early, bank runs become a

self-fulfilling prophecy: any indication that there *may* be a bank run can itself *cause* a bank run.[1]

Diamond and Dybvig (1983) propose that a system of government-provided deposit insurance can mitigate the danger of bank runs. The authors assume that the government has an advantage over private banks because it can enact its desired policies ex post once the optimal allocation of resources is known. "In particular, it can tax those agents who withdrew 'early' in period T = 1." By contrast, "a private insurance company is constrained by its reserves in the scale of unconditional guarantees which it can offer" (Diamond and Dybvig 1983: 413). They conclude that "this asymmetry allows a potential benefit from government intervention" (p. 414). Once it is known that the government will redistribute any undeserved gains from bank runs, agents no longer have an incentive to run on the bank. Hence, the government's commitment to providing deposit insurance precludes the possibility of a bank run and guarantees that deposit insurance payouts will never be necessary. In this way, government deposit insurance becomes a costless solution to the problem of bank runs.

Other works extend the DD model to examine the optimality of deposit insurance under a variety of assumptions. Dowd (1988), Wallace (1990), Selgin (1993), and Green and Lin (2000) propose alternative measures, such as proper capital allocation and suspending deposit redemptions to improve upon government deposit insurance. Peck and Shell (2003) show even those optimal contracts may be subject to runs. Others study the effects of signaling and information on the potential for runs (e.g., Samartin 2003; Andolato, Nosal, and Wallace 2007). However, each employs a model applicable only under a strict set of assumptions, with little consensus as to which is the most useful representation of deposit insurance in practice.

Diamond and Dybvig (1983) acknowledge the implementation of deposit insurance is likely to be suboptimal. They note that their model produces "a very strong result (which may be too strong) about the optimality of government deposit insurance" (p. 414). The costs of actual deposit insurance deviate from the DD model in several ways. Taxes assessed on banks to fund deposit insurance will cause the provision of insurance to be suboptimal because there are real costs to assessing and collecting taxes. Diamond and Dybvig

[1] Diamond and Dybvig (1983: 410) argue that a bank run may be caused by any "commonly observable random variable in the economy . . . even sunspots."

(1983: 415) state that "if a nonoptimal tax must be imposed, then when t is stochastic there will be some tax distortions and resource costs associated with government deposit insurance."[2] Furthermore, to the extent that failures resulting from bank runs are indistinguishable from other types of failure, government-provided deposit insurance is more likely to be under- or oversupplied.

Government deposit insurance departs markedly from that proffered in Diamond and Dybvig (1983). To further illustrate the differences between deposit insurance in theory and practice, and to more clearly understand the actual costs, we examine deposit insurance offered under the FDIC.[3]

FDIC Deposit Insurance

The FDIC was established by the Banking Act of 1933 primarily in response to widespread bank failures in that year. Prior to the FDIC, deposit insurance was provided at the state level. However, rural bank failures during the economic downturn of 1921 and the decade of crop failures that followed proved too much for these funds to handle, and all had ceased operations by 1930. Despite initially opposing federal deposit insurance, President Franklin D. Roosevelt signed the bill into law on June 16, 1933. By January of the following year the program was up and running.[4]

The history of the FDIC has been presented in much greater detail elsewhere.[5] Since we are ultimately concerned with the cost of deposit insurance in practice, our aim is limited to expositing the

[2] Diamond and Dybvig (1983: 416) claim that "so long as the government can impose some tax to finance the insurance, no matter how distortionary, there will be no runs and the distorting tax need never be imposed."

[3] Considering a single case of government-provided deposit insurance allows for greater depth of analysis. However, it provides no assurance that the case at hand is representative. Our decision to focus on the FDIC reflects our familiarity with the case and the ease with which data can be obtained. As a result, the reader is cautioned to consider the generalizability of the case at hand.

[4] Initially, the FDIC was designed to start on July 1, 1934. A late amendment proposed by Senator Arthur Vandenburg created the Temporary Federal Deposit Insurance Fund, which would operate in the interim from January 1, 1934 to July 1, 1934. Extensions approved on June 16, 1934, and June 28, 1935, postponed the transition to the permanent corporation to September 1, 1935.

[5] For a more detailed account, the reader is advised to consult FDIC (1984), Calomiris and White (1994), Kaufman (2002), Bradley (2000), and Kroszner and Melick (2008).

size, scope, and function of the FDIC over time. Specifically, we consider the maximum amount covered, number of bank failures, and the cost of managing the deposit insurance fund since the FDIC was established.[6]

FDIC Coverage

Both the real amounts covered by FDIC deposit insurance and the percentage of bank deposits insured by the FDIC have consistently increased over time. When the deposit insurance program kicked off in 1934, the maximum amount insured per depositor was set at $2,500. Depositors holding $2,500 or less in a member bank would have the entire balance of their accounts "backed by the full faith and credit of the United States government," which promised to pay 100 cents on the dollar should the bank become unable to meet the demands of the depositor.[7] Depositors holding more than $2,500 would receive 100 cents on the dollar for the first $2,500 held in eligible accounts, but no coverage was extended to the remaining balance.

Bradley (2000: 7) maintains that the $2,500 maximum was established for two reasons. First, it put banks on a level playing field with the Postal Savings System (PSS). Deposits held in the PSS were limited to $2,500, and since the PSS was a government program, those accounts were already backed by the full faith and credit of the U.S. government. Establishing the maximum amount covered under the FDIC at $2,500 merely extended the coverage already offered on PSS accounts to deposits held at banks. Second, the $2,500 maximum served as a compromise between bankers and depositors. Still struggling from the financial crisis, bankers feared they would be unable to afford assessments for complete coverage. Depositors, on the other hand, preferred complete coverage. Since roughly 97 percent of depositors in 1933 held less than $2,500 in accounts, limiting coverage to $2,500 per depositor allowed for lower assessments while providing most depositors with complete coverage.

The maximum amount insured per depositor is legally established in nominal terms. As a result, it must be continually adjusted to keep

[6] These data are taken from the FDIC's *2010 Annual Report* available at www.fdic.gov/about/strategic/report/2010annualreport/index_pdf.html.

[7] As described in Title IX of the Competitive Equality Banking Act of 1987.

TABLE 1
Nominal Maximum Individual FDIC Coverage Amounts, by Period

Time Period	Nominal Amount Covered by FDIC
1934–35	$2,500
1935–50	$5,000
1950–66	$10,000
1966–69	$15,000
1969–74	$20,000
1974–80	$40,000
1980–2008	$100,000
2008–Present	$250,000

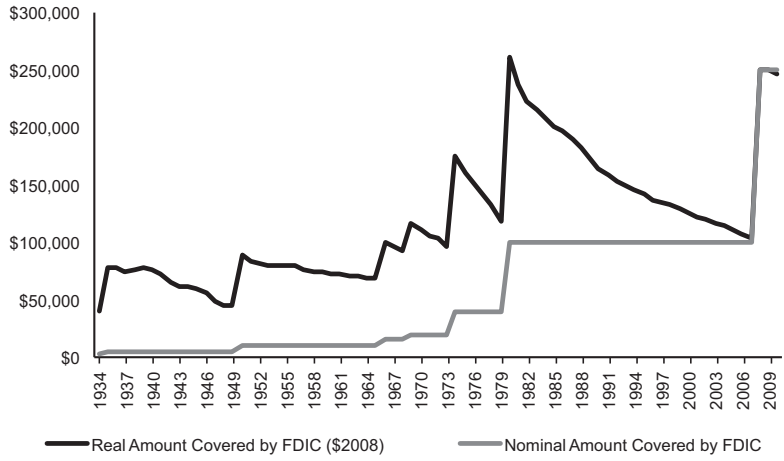
Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

up with inflation if coverage is to be held constant through time. Since 1934, the maximum amount covered under FDIC has been increased seven times. Historical coverage amounts are presented in Table 1.

The infrequency with which the maximum amount insured per depositor has been adjusted means that the real (inflation-adjusted) amount covered by the FDIC varied significantly over the history of the program. Since there are positive costs associate with changing the nominal maximum, it does not necessarily follow that infrequent adjustments are inefficient.[8] Nonetheless, it is important to consider the real maximum amount insured per depositor. Controlling for inflation allows one to see how much of a depositor's wealth is actually protected by deposit insurance at a particular point in time, as well as how coverage levels have changed through time. Understanding the extent to which accounts are protected by deposit insurance will be useful in assessing the historical cost of providing insurance under the FDIC. The inflation-adjusted maximum amount insured per depositor over time is depicted as a solid black

[8] In a 1980 speech before Congress, for example, then-FDIC Chairman Irving H. Sprague estimated that increasing the maximum amount covered would result in up to $750,000 in direct costs to the FDIC (Bradley 2000: 19).

FIGURE 1
Real and Nominal Maximum FDIC Coverage Amounts, 1934–2010



Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

line in Figure 1 alongside the solid grey line representing the nominal amount covered.

Since its inception, the real scope of federal deposit insurance (reported in constant 2008 dollars) has increased by roughly 514 percent, from $40,168 in 1934 to $246,706 in 2010. Steady inflation from 1935 to 1965 and infrequent adjustments (only once over the period, in 1950) resulted in a relatively large range of coverage, from a low of $44,669 in 1948 to a high of $89,337 in 1950. The average for the 30-year period totaled $70,974. The 15-year period that followed saw several increases in FDIC coverage (in 1966, 1969, 1974, and 1980).[9] From 1965 to 1980, the real amount covered per depositor increased by roughly 282 percent. The largest increase in the period occurred in 1980, when the real amount covered was more than doubled from $118,624 to $261,290. In 1980, the real amount

[9] The amount of public unit deposits covered was also increased in 1974. Whereas the maximum covered for nonpublic unit accounts was upped from (nominal) $20,000 to $40,000, the maximum for public unit deposits increased from $20,000 to $100,000. We report only the increase for nonpublic unit deposits in Table 1 and Figure 1.

covered per depositor was greater than any other year in the history of the FDIC.

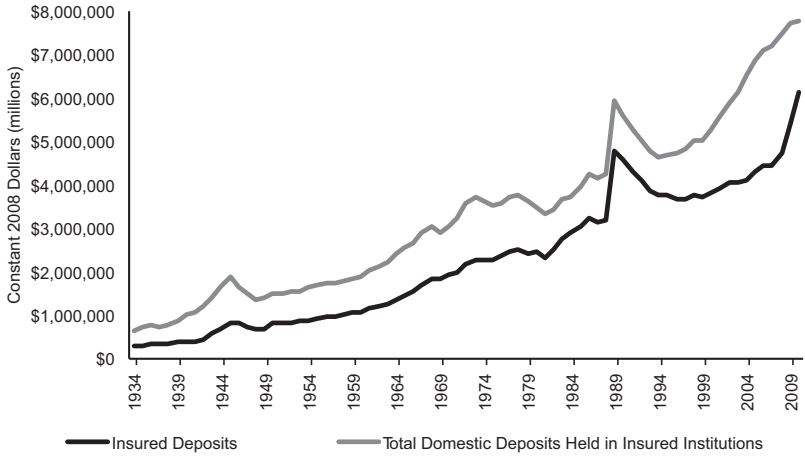
Inflation eroded the real scope of deposit insurance from 1980 to 2007. However, over the entire period, coverage amounts remained well above the 1934 to 1979 inflation-adjusted average of $85,720. In 2008, the real amount covered by the FDIC increased by 141 percent, from $103,840 to $250,000.[10] As such, it is the single largest real increase in the history of the program. As of 2010, the real amount covered by the FDIC totaled $246,706. Although large by historical standards, the real coverage amount today is comparable to that offered in 1980.

Although the maximum amount covered under FDIC has outpaced inflation on average, the real increase in deposit insurance might merely reflect the increase in income over the same period. As incomes increase, depositors become wealthier and the maximum amount covered must also increase if the proportion of the average depositor's wealth protected under FDIC is to be maintained. However, this is not generally the case. From 1934 to 1965, real coverage per depositor increased at an annualized rate of 1.68 percent from $40,168 to $68,350, whereas real GDP per capita increased at an annualized rate of 3.52 percent from $8,391 to $25,406. Over the 16-year period from 1965 through 1980, real GDP per capita grew at an annualized rate of 1.46 percent while real coverage per depositor managed an astounding 8.74 percent. The maximum amount covered fell relative to GDP from 1980 to 2007. Even still, real coverage has outpaced real GDP per capita over the history of the program, growing at 2.39 and 2.25 percent per year, respectively.

As population and income per capita have increased over the last 75 years, the amount of funds held in member institutions and the amount insured under the FDIC have also increased. Insured and total domestic deposits held in member institutions, measured in millions of 2008 dollars, are depicted in Figure 2 as solid black and grey lines respectively. Total deposits grew at an average

[10] The statutory increase from $100,000 to $250,000 in September 2008 was originally set to revert back to $100,000 in January 2010. The temporary increase was then extended to last until January 2014. The signing of the Dodd-Frank Wall Street Reform and Consumer Protection Act on July 21, 2010, made the temporary increase permanent.

FIGURE 2
Insured and Total Domestic Deposits, 1934–2010



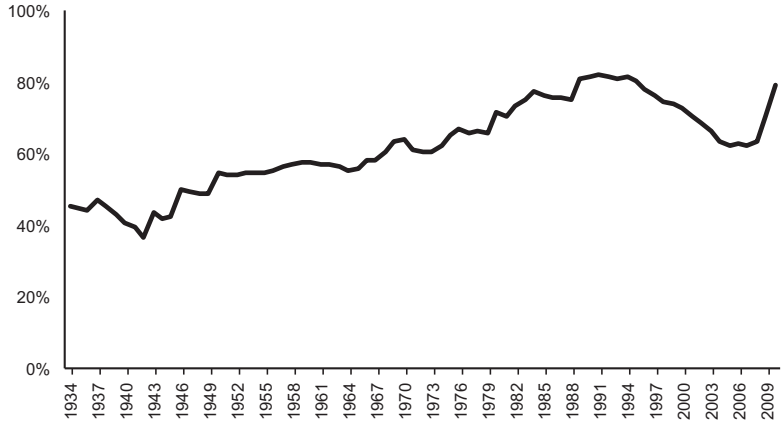
Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

annual rate of 3.29 percent, from $643,660 million in 1934 to $7,783,791 million in 2010. Over the same period, insured deposits increased by 4.04 percent per year, from $290,418 million to $6,139,149 million.

Also observable in Figure 2, the proportion of total deposits insured under the FDIC has increased over the history of the program. To make this even clearer, we present the proportion of total domestic deposits held in insured institutions covered by the FDIC in Figure 3. At its inception in 1934, 45.12 percent of domestic deposits held in member institutions were insured. The proportion then fell to an all-time low of 36.54 percent in 1943, after which it increased steadily to a high of 82.05 percent in 1991. In 2010, the FDIC covered 78.87 percent of domestic deposits held in insured institutions.

In general, the above data confirm that federal deposit insurance coverage has increased since 1934. Upward adjustments to the nominal maximum amount insured per depositor have outpaced both inflation and growth in GDP per capita. As a result, the proportion of deposit balances covered by the FDIC has grown as well.

FIGURE 3
Insured Deposits as a Percentage of Total Deposits, 1934–2010



Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

Bank Failures under the FDIC

As discussed earlier, deposit insurance removes the incentive for depositors to run on solvent banks. Since a run forces the bank to liquidate its long positions in order to cover withdraws on demand, one might expect there to be fewer bank failures when deposits are insured. However, it does not follow that deposit insurance will prevent all (or even most) bank failures. Banks also fail from making unsound investments in risky assets. Poorly managed banks suffer losses just like any other poorly managed firm, and sufficiently bad banks fail. Absent a carefully constructed counterfactual, the raw number of bank failures in the presence of deposit insurance provides no indication as to whether (and to what extent) the scheme is working.

Although the number of failing banks cannot be used to gauge how well government-provided deposit insurance is working, it could significantly affect the cost of the program. In practice, it is difficult to distinguish whether a bank has failed because of a run or whether depositors are running because a bank has failed. Under the FDIC, depositors are compensated regardless of what prompts the bank to fail. Hence, even if the deposit insurance scheme is working, the costs of providing deposit insurance might still exceed the benefits.

TABLE 2
Number of Bank Failures, by Decade

Decade	Failures
1930s[a]	312
1940s	99
1950s	28
1960s	43
1970s	76
1980s	1,015
1990s	490
2000s	197
2010s[b]	157

[a] Data unavailable for years 1930, 1931, 1932, 1933.

[b] Only includes data from 2010.

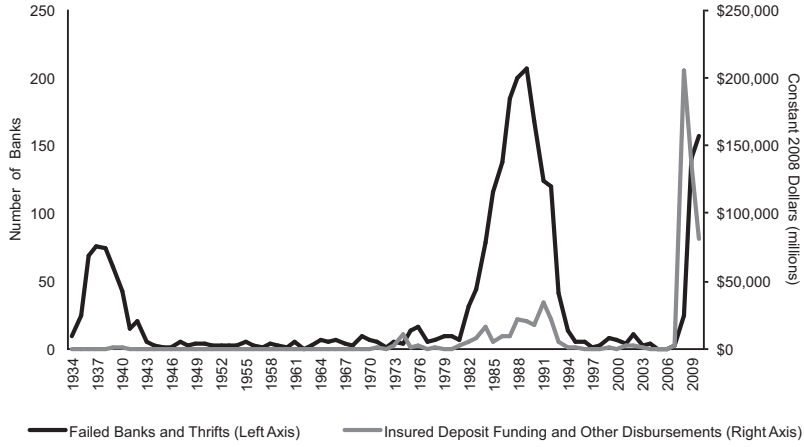
Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

The number of bank failures for each decade between 1930 and 2010 are presented in Table 2.[11] Over the period, 2,417 banks and thrifts failed—roughly 31 per year on average. Bank failures are not distributed evenly over the period, however. The 1950s and 1960s saw relatively few failures—only 28 and 43, respectively. The 1980s, in contrast, witnessed 1,015 failures—accounting for more than 40 percent of all failures between 1934 and 2010. Similarly, more failures occurred in 2010—the last year for which data are available—than in the 1950s and 1960s combined.

The black line in Figure 4 depicts the number of bank failures in each year between 1934 and 2010. Three periods stand out. During the second half of the Great Depression (1935–42), 381 banks closed their doors at an average rate of 3.97 banks per month. The average rate equaled 9.38 banks per month during the Savings and Loan Crisis (1982–94). In total, 1,464 banks closed over the period, with 206 occurring in just one year (1989)—more than any other single year in the series. Finally, in the most recent financial crisis (2008–10), 322 banks failed at an average rate of 8.94 per month.

[11] Since the series starts in 1934, data are unavailable for years 1930, 1931, 1932, and 1933.

FIGURE 4
Disbursements to Depositors of Failed and Assisted Banks under FDIC, 1934–2010



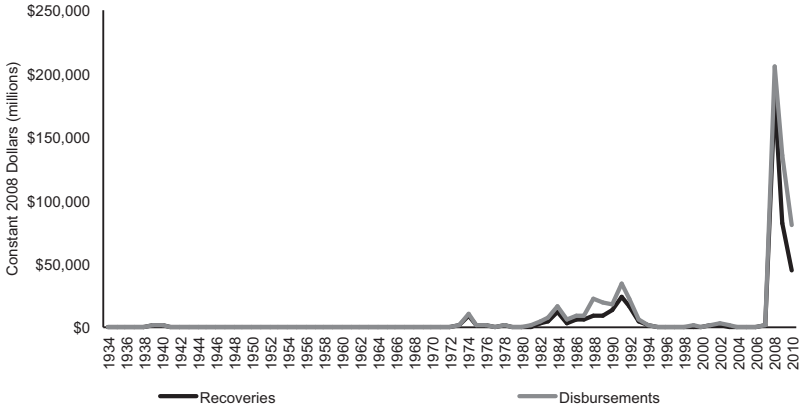
Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

Although the number of bank failures provides some context, we are ultimately concerned with the cost of bank failures on the deposit insurance program and should therefore consider the size of banks failing. One indicator of the magnitude of banks failing is the amount disbursed by the FDIC to depositors. Disbursements to depositors of failed and assisted banks by the FDIC from 1934 to 2010 are depicted by the solid grey line in Figure 4. Disbursements are measured in millions of inflation-adjusted dollars (100 = 2008) along the right vertical axis. The graph is consistent with the stylized facts of the three periods discussed above. The average bank that failed between 1935 and 1942 was relatively small. Many were rural banks, holding little on deposit. The FDIC disbursed only $4,347 million over the period—averaging $543 million per year and $11.41 million per failed bank. Failures occurring between 1982 and 1994 were generally more substantive than those in the earlier period. Disbursements totaling $177,703 million—more than 40 times the amount disbursed in the second half of the Great Depression—reflect the greater number of larger banks failing over a longer period of time. On average, the FDIC disbursed $13,669 million per year between 1982 and 1994, more than $121.38 million per failed bank. Finally, as expected, the most recent financial crisis saw significantly larger banks failing over a much shorter period. Although more banks failed between

1982 and 1994 than 2008 and 2010, the amount disbursed to depositors of failed banks more than doubled to $422,597 million in the latter period. Between 2008 and 2010, disbursements by the FDIC averaged $140,866 million per year, $1,312.41 million per failed bank.

The aforementioned disbursements are offset in part by recoveries obtained from failed and assisted banks. Recoveries indicate any value recovered from the sale of a failed or assisted bank's assets. Recoveries by the FDIC from 1934 to 2010 are depicted by a solid black line in Figure 5.[12] For reference, we include disbursements over the same period as a solid grey line. Both disbursements and recoveries are measured in millions of inflation-adjusted dollars (100 = 2008). From 1935 to 1942, $3,989 million was recovered from failed banks—$498.68 million per year on average, or $10.47 million per bank failure. As the number and size of failing banks picked up during the Savings and Loan Crisis, the amount recovered also increased. Recoveries totaled $115,076 million from 1982 to 1994, averaging $8,852.04 million per year and $78.60 million per failed bank. Finally, from 2008 to 2010, the amount recovered exceeded $339,529 million. In other words, roughly $113,176.57 million was recovered each year over the three-year period—averaging $1,054.44 million per failed bank.

FIGURE 5
Disbursements and Recoveries under FDIC, 1934–2010

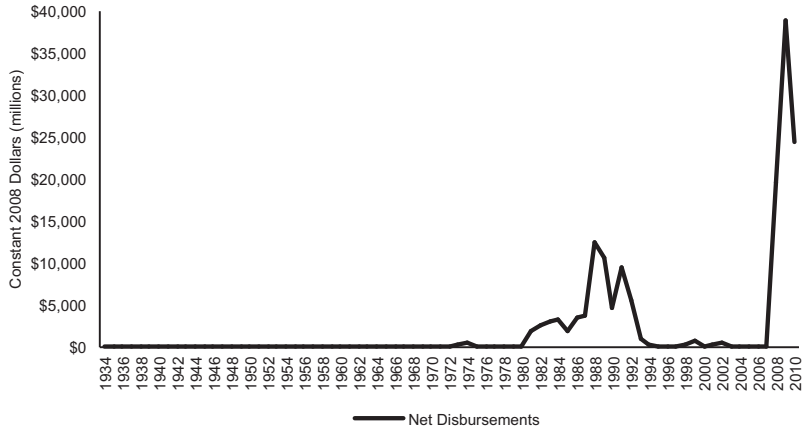


Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

[12] We include additional recoveries estimated by the FDIC but not yet realized. Years with nonzero estimated recoveries include 1991, 1992, 1998, 1999, 2001, 2002, 2003, 2007, 2008, 2009, and 2010.

In order to more clearly depict the difference between disbursements and recoveries over time, net disbursements by the FDIC between 1934 and 2010 are presented in Figure 6. Net disbursements indicate the amount disbursed to depositors of failed banks less recoveries from the sale of bank assets. Again, we consider the three periods of above average bank failures. Net disbursements averaged $44.65 million per year from 1935 to 1942, less than $1 million for each failed bank. From 1982 to 1994, net disbursements averaged $4,817.39 million per year—ranging from a high of $12,590.84 million in 1988 to a low of $260.12 million in 1994—with each bank failure producing an average net disbursement of $42.78 million. Net disbursements were significantly higher from 2008 to 2010. Roughly $27,689.01 million was disbursed each year on net—more than $257.97 million for each failed bank.[13]

FIGURE 6
Net Disbursements under FDIC, 1934–2010



Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

How much has the FDIC spent to cover the deposits of failed and assisted banks? Net disbursements by the FDIC over the history of the program exceed $152,000 million—averaging roughly $1,974 million per year. From 1934 to 2010, cumulative net disbursements grew at an average annual rate of 15.11 percent. Growth in

[13] Although net disbursements were largest in the recent financial crisis, the percentage of disbursements recovered was also higher in this period than in the S&L crisis.

cumulative net disbursements was just below trend from 1934 to 1980, averaging an annual rate of 14.80 percent. From 1980 to 1992 the average annual growth rate shot up to 30.91 percent, reflecting the wave of bank failures associated with the Savings and Loan Crisis. Cumulative net disbursements returned to trend between 1992 and 2006, averaging just 0.35 percent growth per year over the period. Then, as bank failures increased during the most recent financial crisis, cumulative net disbursements shot back up. From 2006 to 2010, cumulative net disbursements have grown at an annualized rate of 17.20 percent.

Government-provided deposit insurance removes the incentive for depositors to run on banks and thereby prevents a solvent bank from failing because an unnecessary run has rendered it illiquid. It does not prevent banks from failing for other reasons. The case of FDIC illustrates the point. From 1934 to 2010, 2,417 FDIC member banks failed. The commitment to insuring deposits at these banks resulted in substantial costs for the deposit insurance program.

One might be tempted to conclude that the costs arising from the failure of insolvent banks could be avoided by only promising to pay out in cases of bank failures caused by runs (i.e., when banks are solvent but illiquid). If deposit insurance removes the incentive for depositors to run on a bank, failures resulting in the presence of deposit insurance must stem from other factors. Hence, deposit insurance should never pay out in practice and, as in the DD model, deposit insurance becomes a costless solution. Unfortunately, this simple solution is ultimately ineffective, as it fails to take into account expectations involved in the dynamic game. If agents know in advance that deposit insurance will never pay out in practice, they can have little confidence that their deposits will be covered in the event of a run-induced failure. Although their belief that deposits will be covered in the event of a run would be sufficient to prevent such runs from occurring, they have no basis to hold such beliefs if they know deposit insurance never pays out in practice. In other words, the inability to distinguish run-induced failures from other types of failure cuts both ways: the guarantor cannot identify which depositors should be covered ex post and depositors cannot hold beliefs ex ante that the set of those ultimately denied coverage will be limited to those that should not have been covered. Indeed, paying out in cases of

known insolvency might be a costly signal necessary to induce depositors to hold the beliefs on which deposit insurance schemes rely. If this is the case, the costs associated with nonrun bank failures cannot be avoided under government-provided deposit insurance schemes.

Cost of Managing the Deposit Insurance Fund

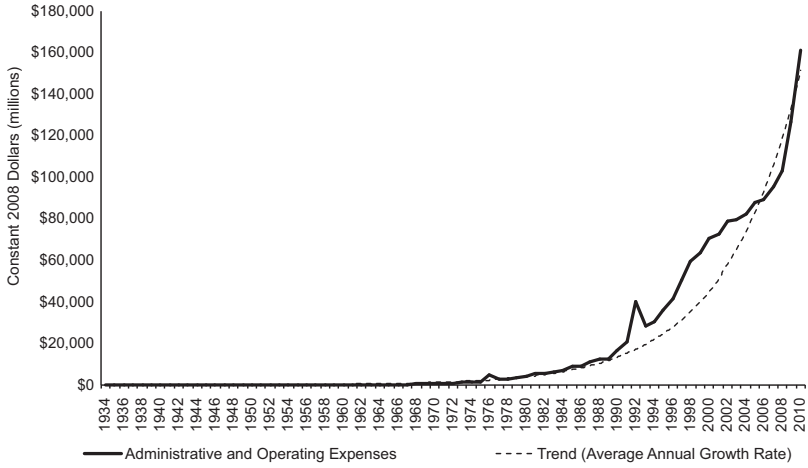
In order to cover the positive net disbursements arising from bank failures, the FDIC manages a deposit insurance fund primarily supported by fees assessed annually on member banks.[14] Managing the DIF is anything but costless. The FDIC has teams of administrators, auditors, and staff—a total of 8,150 employees in 2010. According to its annual report, the FDIC paid these employees over $1 billion in wages and salaries for the year. Furthermore, the organization owns $416 million in plant, property, and equipment with which these employees conduct the day-to-day operations of the FDIC. Although these costs are conspicuously absent in the DD model, they are essential for government-provided deposit insurance in practice.

Annual administrative and operating expenses from 1934 to 2010 are presented in Figure 7 with a solid black line.[15] Administrative and operating expenses have grown at an average annual rate of 10.23 percent since 1934. The average annual growth rate is depicted as a dashed black line in Figure 7. From 1934 to 1987, administrative and operating expenses grew roughly at trend, averaging $1,559 million each year. Administrative and operating expenses outpaced trend from 1988 to 1999, growing at an average annual rate of 13.71 percent and averaging $34,332 each year. Returning to trend in 2005, administrative and operating expenses have since grown at roughly 10.18 percent each year.

[14] The DIF was originally named the Federal Deposit Insurance Fund. In 1989, it was renamed the Bank Insurance Fund (BIF) in accordance with the Financial Institution Reform, Recovery, and Enforcement Act (FIRREA), which also created the Savings Association Investment Fund (SAIF) to be administered by the FDIC (FDIC 1998: 51). The BIF and SAIF were later merged into a singled fund, the DIF, according to the Federal Deposit Insurance Reform Act of 2005 (Pennacchi 2009: 6 n.12).

[15] Administrative and operating expenses do not include charges to failed bank receiverships managed by FDIC.

FIGURE 7
Annual Administrative and Operating Expenses, 1934–2010

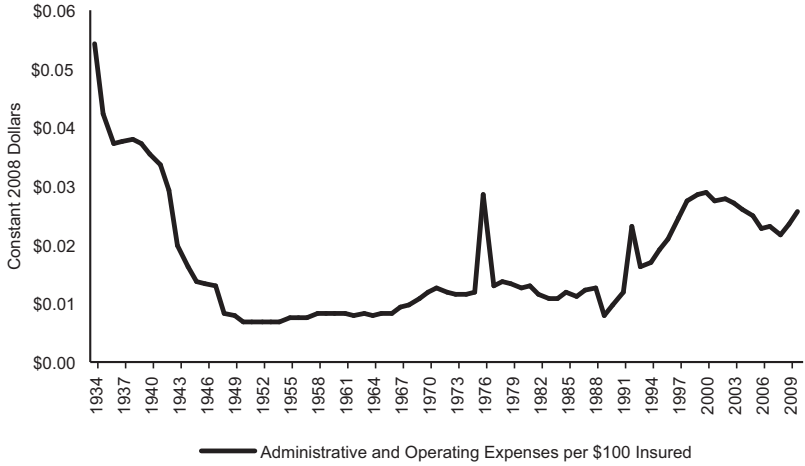


Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

The exponential increase in administrative and operating expenses corresponds to the increasing scope of the FDIC. Recall that coverage has increased significantly over the history of the program, both in terms of the number of depositors covered and the extent of coverage each depositor receives. As such, it is worth considering the cost of a constant coverage amount over time. Annual administrative and operating expenses per $100 insured between 1934 and 2010 are depicted by a solid grey line in Figure 8.

Constant coverage administrative and operating expenses fell from $0.054 per $100 insured in 1934 to $0.008 in 1948. It then leveled off, averaging $0.010 from 1949 to 1989, with the exception of 1978 when it spiked to $0.028. Constant coverage administrative and operating expenses climbed from $0.007 in 1950 to $0.029 in 2000, before falling back down to $0.023 in 2007. In 2010, administrative and operating expenses per $100 insured totaled $0.026. Over the entire period, administrative and operating expenses averaged $0.017 per $100 insured, with nearly three quarters of the observations falling between $0.007 and $0.027.

FIGURE 8
Annual Administrative and Operating Expenses per $100 Insured, 1934–2010



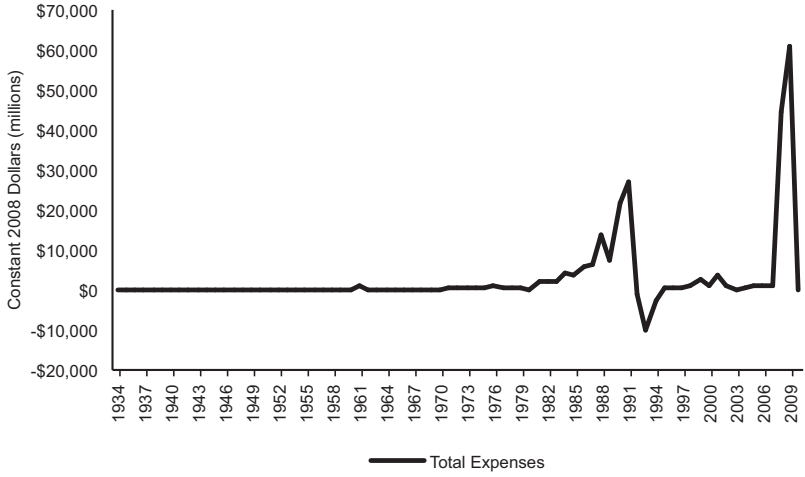
Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

Annual total expenses for the deposit insurance fund are presented in Figure 9. In addition to administrative and operating expenses, total expenses incudes provision for insurance losses and interest and other insurance expenses.[16] Annual expenses averaged $208 million between 1934 and 1980, ranging from $55 million in 1951 to $827 million in 1961. With the Savings and Loan Crisis underway, average total expenses increased to $5,515 million between 1981 and 1995. Variability also increased over the period, ranging from a high of $26,755 million in 1991 to a low of –$10,049 million in 1993.[17] Total expenses then receded, averaging only $1,166 million from 1996 to 2007. More recently, bank failures—which required enormous provisions for insurance losses—caused total expenses to increase markedly. Total expenses equaled $44,340 million in 2008 and $60,926 million in 2009.

[16] Funding transfers from the FSLIC resolution fund totaling $139.4 million are included in years 1989, 1990, 1991, and 1992.

[17] Negative total expenses are recorded when the DIF experiences a negative "provision for insurance losses," indicating that net disbursements throughout the year and into the future were and/or are expected to be lower than previously expected.

FIGURE 9
Annual Total Expenses for Deposit Insurance Fund, 1934–2010



Source: Federal Deposit Insurance Corporation, *2010 Annual Report*.

Cumulative total expenses have grown exponentially at an average annual rate of 9.33 percent. Prior to the Savings and Loan Crisis, the cost of the FDIC amounted to roughly $11,802 million. From 1982 to 1994, total expenses increased by an astounding $80,428 million—more than six times the cost of the FDIC from 1934 to 1981—bringing the total cost to $92,230 million. Another significant increase occurred between 2007 and 2010. Cumulative total expenses more than doubled over the period, increasing from $106,502 million in 2007 to $211,841 million in 2010.

Reviewing the history of the FDIC yields several stylized facts. First and foremost, it is quite clear that government-provided deposit insurance is costly. Indeed, administrative and operating expenses have increased over the history of the program. Part of the observed increase can be attributed to increases in coverage. More wealth is held in the banking system today than in 1934, and the FDIC protects a larger amount of each depositor's wealth. Even still, annual administrative and operating expenses per $100 insured were higher in the 1990s and 2000s than in the 1950s and 1960s. Adding to the increase in administrative and operating expenses are costs associated with bank failures. Provision for insurance losses in the Savings

and Loan Crisis from 1982 to 1994 and the more recent crisis from 2008 to 2010 have drastically increased the cost of deposit insurance. These stylized facts provide a starting point for comparing government-provided deposit insurance with potential alternatives.

Alternatives to Government-Provided Insurance

Our analysis demonstrates that government-provided deposit insurance departs markedly from the theoretical ideal conceptualized in the DD model. If alternatives were nonexistent or sufficiently costly, the shortcomings of government-provided deposit insurance in practice might be of little consequence. Therefore, it is useful to consider some potential alternatives. We briefly review private insurance, self-regulation, and other market mechanisms that might protect depositors from bank failures. Although a full comparative institutional analysis is beyond the scope of this article, the potential alternatives discussed below should provide the reader with a clearer view of the sort of comparisons we have in mind.

An obvious alternative to government-provided deposit insurance is privately provided deposit insurance. Such schemes were once common in the United States, arising naturally out of the private regional associations used to clear checks and banknotes. According to Calomiris (1990: 284–85), "Formal coinsurance arrangements among bank clearinghouse members, and less formal arrangements among other banks—especially in the branch-banking states of the antebellum South—provided many of the features of government deposit insurance."

Private and privately managed deposit insurance is not merely a thing of the past. Demirgüç-Kunt and Sobaci (2000) consider 109 countries with explicit deposit insurance programs.[18] Eleven of these countries—including Argentina, Austria, Brazil, Finland, France, Germany, Luxembourg, Norway, Switzerland, Tanzania, and the United Kingdom—have privately managed programs. Another 24 countries have deposit insurance programs that are managed jointly through some sort of public-private partnership. Only 33 countries have publicly managed deposit insurance programs like the United States.

[18] See also: Demirgüç-Kunt and Sobaci (2001), Demirgüç-Kunt, Karacaovali, and Laeven (2005).

In considering alternatives to government-provided deposit insurance, we might look to a broader set of institutions that stop bank runs and reduce the spread of panics. Clearinghouses would seem to fit the bill. Prior to the Federal Reserve, private banks used clearinghouses to coordinate activities. Clearinghouses worked primarily by allowing banks to coordinate activity when it was in the interest of the system. According to Gorton (1985: 277), "During financial panics, the clearing house united banks into an organization resembling a single firm." Acting in concert made it easier to suspend convertibility of banknotes into specie, which prevented bank runs from destroying otherwise solvent banks. As Gorton and Mullineaux (1987: 462) make clear, "The advantages of the [commercial-bank clearinghouse] organization were such that within a decade a large number of local clearinghouses were formed."

When held liable for losses, bank managers have an incentive to curtail excessive risk.[19] Historically, bank owners faced unlimited or double liability for any losses they incurred. Hence, owners had a strong incentive to monitor the bank's risk-taking activities and remove excessively risky managers. Macey and Miller (1992: 34) find that "empirical evidence substantiates the inference that double liability was an effective regulatory system" and "unlike deposit insurance, the threat of double liability appears to have induced caution on the part of bank managers in their use of depositors' funds."

Prior to FDIC deposit insurance, bank owners were more vigilant in monitoring risk. They sometimes required bank managers to post performance bonds to the equivalent to one or more years of their annual salaries, which would be forfeited in the case of the bank's failure (White 2011). Similar tools are once again being implemented today in the form of "clawback" clauses, which require bank managers to repay past bonuses. In recent cases, however, such clauses are generally triggered by ethics violations rather than performance alone (Attwood 2012, Hodgson 2012). We hope that regulators will consider these mechanisms of depositor protection as alternatives to government-provided deposit insurance.

[19] The incentives bank managers face are widely discussed in the economic literature on free banking. White (1984, 1989), Selgin (1988), and Dowd (1993) all discuss the manager's need to balance the marginal benefits and costs of the assets and liabilities under his control. Moreover, they provide evidence that such risk-management strategies have been employed successfully to reduce bank risk and enhance economic stability in Britain, Scotland, Australia, and the United States.

Conclusion

Much analysis of government-provided deposit insurance evaluates a costless means of protecting depositors. As the case of the FDIC illustrates, government deposit insurance is costly. Costs are incurred in assessing fees from banks, covering losses when banks fail, and monitoring the banking system. An understanding of the costs of government-provided deposit insurance in practice is essential for any discussion of potential alternatives.

In this article, we reviewed the performance of the FDIC and examined how the costs of federal deposit insurance have changed over time. We also used the FDIC experience as a benchmark against which potential alternatives might be compared. We found that deposit insurance in practice departs markedly from the ideal, costless system espoused by Diamond and Dybvig (1983). As such, a meaningful analysis of deposit insurance must incorporate the costs of government-provided insurance.

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