

CHAPTER NINE

When Public Institutions Bet on Spreads

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9.1 Introduction

Chapter 8 argued from the arithmetic: the spread between what emerging-market sovereigns pay and what the TFIF's sponsors and bondholders charge is a payment for risk, and once the risk is paid for, the cost of borrowing is met and the fund is run, what remains is a fraction of what the Concept Note promises. This chapter asks a different and simpler question. Public bodies have tried before to fund what they wanted out of the difference between their own cheap credit and some higher return in the financial markets. What happened to them?

The chapter tells five stories. Four are about state institutions: the City of Detroit, which in 2005 borrowed \$1.6 billion to put into its pension funds on the assumption that the funds would earn more than the debt cost; Orange County, California, whose treasurer in 1994 had turned \$7.6 billion of public deposits into \$20.6 billion of securities by borrowing against what he bought; eight Norwegian municipalities, which between 2001 and 2007 borrowed sums calculated from their future power revenues in order to buy structured credit; and the German Landesbanken, above all Sachsen LB, which used the state guarantee behind their borrowing to fund tens of billions of euros of securities for the spread. The fifth, Long-Term Capital Management, was a private fund, and it is here because it is the same strategy carried out at the largest scale by the people who understood it best, and because the way it failed is the way the others failed.

Each section tells the story of borrowing and default: what was done and why, what was bought, how it failed, who paid, and what was done afterwards. Only at the end of each section is the case set beside the TFIF, and then not to say that the TFIF is Detroit or Orange County, which it is not, but to draw out two or three things the case shows that illustrate how unrelenting the arithmetic in Chapter 8 can be. The sections are ordered by argument rather than by date. Detroit comes first because its decision took the form in which the TFIF's sponsors are asked to take theirs; the cases that follow move the risk from interest rates to credit, then to the source of the spread itself, and Long-Term Capital comes last because it shows most clearly how a loss becomes a collapse.

The concluding section sets out what the five have in common, and then looks further back, because the idea that a government's credit is an asset to be put to work in the markets did not begin with the TFIF or even in 1994. It is at least as old as the American states of the 1830s, and

it has ended the same way often enough that the sponsors of the TFIF are entitled to ask why this time should be different.

9.2 Detroit, 2005–2013

In 2005 the City of Detroit was behind on the contributions it was legally required to make to its two pension funds, and it could not borrow the shortfall, because the amount would have taken it over the debt limit in Michigan's Home Rule City Act. It "borrowed" anyway. The city created two non-profit "service corporations," one for each pension fund, and contracted to pay them for "helping the City with its funding obligations to the retirement systems." The corporations set up trusts that sold investors certificates of participation in those contract payments, and passed the proceeds to the pension funds. Judge Steven Rhodes, who later presided over the city's bankruptcy, described the effect: "by creating this structure, the City could characterize the payments that it made as contractual obligations for future services under the Service Contracts, rather than debt service. This allowed the City to avoid (or evade) the debt limitations."¹ The first issue, in June 2005, raised \$1.44 billion: \$640 million at fixed rates of 4.0% to 4.948%, and \$800 million at a floating rate. In 2006 the floating certificates were replaced by a new floating series of the same size, and \$148.5 million was added at 5.989%, with maturities running to 2035.² In all the city borrowed about \$1.6 billion.

The purpose was to earn a spread. The certificates cost the city about 5% a year; the pension funds assumed that their investments would earn 7.9% and 8%. Wallace Turbeville, a former investment banker who examined the transaction in 2013, put the rationale in one sentence: "the cash proceeds would be invested by the pension fund, and the city would make more on the investments than it would pay in interest."³ The difference of about three percentage points was the whole case for the borrowing, and it was assumed to hold for thirty years. The transaction won the Bond Buyer's award as the Midwest's deal of the year.⁴

Half the borrowing was at a floating rate, and the city fixed it with eight interest-rate swaps covering the \$800 million, under which it paid a fixed rate to two banks, UBS and a Merrill Lynch subsidiary, and received a floating one. The swaps carried termination clauses: if the city's credit rating fell below investment grade, or an emergency manager was appointed to run it, the banks could end the contracts and demand at once the present value of everything they

¹ *In re City of Detroit*, Supplemental Opinion Regarding Plan Confirmation, Approving Settlements, and Approving Exit Financing, Bankr. E.D. Mich., Case No. 13-53846, 31 December 2014 (Rhodes J.), Part III.M. The debt limit is in the Home Rule City Act, Mich. Comp. Laws §117.1 et seq.

² City of Detroit, Corrected Fifth Amended Plan for the Adjustment of Debts, 29 July 2014, definitions of "2005 COPs" and "2006 COPs"; Emergency Manager, *Proposal for Creditors*, 14 June 2013, p. 27. The 2005 certificates were Series 2005-A (\$640 million, 4.0% to 4.948%) and Series 2005-B (\$800 million, floating); the 2006 certificates were Series 2006-A (\$148.5 million, 5.989%) and Series 2006-B (\$800 million, floating), maturing from 2019 to 2035.

³ Wallace C. Turbeville, *The Detroit Bankruptcy*, Demos, November 2013, p. 26. The pension funds' assumed returns of 7.9% (general) and 8% (police and fire), net of fees, are at p. 46; the general fund's assumption is confirmed at 7.9% for every year from 2005 to 2014 in the Public Plans Database of the Center for Retirement Research at Boston College.

⁴ Carol O'Cleireacain, "Detroit's Bankruptcy, Pensions and Retirees," Civic Federation and Federal Reserve Bank of Chicago, 17 April 2018, p. 1. O'Cleireacain was Detroit's deputy mayor for economic policy, planning and strategy from 2014 to 2016.

expected to receive over their remaining life.⁵ Detroit's rating had been close to the threshold for years.

The general fund earned 8.3%, 11.3% and 18.9% in the three years to 2007, then lost 4.3% in 2008 and 18.8% in 2009; over the seven years to 2013 it earned about 4% a year against the 7.9% assumed, and its funded ratio went from 101% in 2008 to 70% in 2013.⁶ When short-term rates collapsed in 2008 the swaps turned against it, and it was paying the banks about \$50 million a year on them. In January 2009 the banks gave notice that a downgrade of the certificates would be a termination event; to avoid the termination payment the city agreed that June to pledge its casino wagering-tax revenue as collateral for the swap payments, to pay the banks another 0.1%, and to accept new termination events, one of which was triggered by a further downgrade in March 2012 and another by the appointment of an emergency manager in March 2013.⁷ By then the city owed \$1.43 billion on the certificates and \$344 million on the swaps.⁸

Detroit filed for bankruptcy in July 2013, the largest municipal bankruptcy in American history, with liabilities the court put at \$18 billion. The financial damage had resulted in severe cuts to city services: in 2013 the police took 58 minutes to answer a priority call, against a national average of 11, and about 40% of the city's 88,000 streetlights did not work.⁹ The city sued to have the certificates declared void, on the ground that the service corporations were shams created to get round the debt limit; Judge Rhodes found that "the City would have a reasonable likelihood of success on the merits," and the case was settled. The insurers who had guaranteed the certificates recovered about 13% of their claims, the lowest recovery of any class of creditor. The swap banks, whose termination claim had stood at \$344 million, settled for \$85 million.¹⁰

The people who paid were the beneficiaries of the obligation the borrowing had been meant to fund. Under the plan the court confirmed in November 2014, general retirees lost 4.5% of their accrued pension and the whole of their cost-of-living adjustment; police and fire retirees kept

⁵ *Proposal for Creditors*, p. 28: eight pay-fixed, receive-variable swaps effective 12 June 2006, total notional \$800 million. The counterparties were UBS AG and Merrill Lynch Capital Services, as successor to SBS Financial Products Company: Fifth Amended Plan, definition of "COP Swap Counterparties." Turbeville, pp. 29–30, on the termination provisions and the city's rating.

⁶ Public Plans Database, Detroit General Retirement System: actuarial funded ratio 100.9% (2008), 92.5% (2009), 87.1% (2010), 82.8% (2011), 77.0% (2012), 70.0% (2013); investment returns 8.3% (2005), 11.3% (2006), 18.9% (2007), -4.3% (2008), -18.8% (2009), 8.0% (2010), 18.7% (2011), -0.4% (2012), 11.7% (2013). The geometric average for 2007–2013 is 4.0% a year.

⁷ *Proposal for Creditors*, p. 28; Turbeville, p. 24, whose table of legacy costs shows payments on the COP swaps of \$45 million to \$51 million a year from 2010 to 2013.

⁸ *Proposal for Creditors*, p. 27: \$1.43 billion of certificates outstanding at 30 June 2013, and a negative fair value on the swaps of \$343.6 million at 31 May 2013.

⁹ *Proposal for Creditors*, pp. 13 and 26. The response-time figures are the Detroit Police Department's own for priority-one calls in 2013; the streetlight figure is as of April 2013. Rhodes called the case "an \$18 billion case" in his oral opinion of 7 November 2014.

¹⁰ Rhodes, Supplemental Opinion, 31 December 2014, Part III.M: the city's suit, *City of Detroit v. Detroit General Retirement System Service Corp.*, Adv. Pro. No. 14-04112, filed 31 January 2014; the class 9 settlements, under which Syncora's recovery "is estimated to be 13% of its class 9 claims." The swap settlement of \$85 million, \$42.5 million to each counterparty, was filed on 26 March 2014 and approved in April 2014: Fifth Amended Plan, definition of "COP Swap Settlement."

their base pension but lost 45% of their adjustment.¹¹ The pension funds had received the \$1.6 billion; the returns that were to have serviced it had not come; and the certificates and swaps remained, and were settled at the retirees' expense.

Detroit made its decision in the form in which the TFIF's sponsors are being asked to make theirs: a public body chose to borrow at one rate in order to invest at a higher one, and to fund a permanent obligation out of the difference. Two points follow. First, the spread was an assumption, and the obligation it was meant to service was a contract. Detroit's pension contribution had been a soft obligation, actuarially smoothed and, as the city had shown, deferrable; the certificates converted it into a hard one, payable to investors on fixed dates and enforceable by them. When the assumed 7.9% turned out to be 4%, the contract did not soften. The TFIF has the same shape: its bond coupons and principal are contracts, its Forest Payments are a residual, and Section 8.4 shows what the waterfall does to the residual when the spread falls short of the assumption. Second, the spread that was assumed was of the same order as the Concept Note's. Detroit's three points between a 5% cost of borrowing and a 7.9% expected return, sustained over thirty years, is not far from the Note's 350 bps of gross spread sustained over forty, and Detroit's assumption had behind it the long-run return on a diversified pension portfolio, which is arguably a better-founded figure than the yield on a single class of emerging-market debt. It failed within three years of the money being borrowed.

9.3 Orange County, 1994

The treasurer of Orange County, California, Robert Citron, held the cash of the county and of about 190 school districts, cities and special districts, many of which were required by law to deposit with him, in a single investment pool. By the end of 1994 the deposits came to \$7.6 billion. Citron borrowed against the securities he bought, through reverse repurchase agreements, and used the cash to buy more securities, generally notes of two to five years, many of them issued by federal agencies; then he borrowed against those. A reverse repurchase agreement, a "repo" in the trade, is a short-term loan secured on a security. The borrower sells the security to a dealer and agrees to buy it back on a fixed date, usually within a few months, at a price fixed at the outset, slightly above the sale price; the difference is the interest. If the borrower cannot pay, the dealer keeps the security. Citron's repos ran for less than 180 days. He had explained the method to the county's Board of Supervisors in 1991, with an example in which one security was borrowed against three times, and added that "we have perfected the reverse repo procedure to a new level."¹² On 30 November 1994 the pool held \$20.6 billion of

¹¹ Rhodes, oral opinion on confirmation, 7 November 2014: for the General Retirement System "a 4.5% reduction in accrued pension benefit amount and elimination of COLA"; for the Police and Fire Retirement System "no reduction in the accrued pension benefit amount but a 45% reduction in the cost of living adjustment."

¹² California State Auditor, *Orange County: Treasurer's Investment Strategy Was Excessively Risky and Violated the Public Trust*, Report 94026.3, 28 March 1995, p. 25, quoting the treasurer's annual report to the Board of Supervisors of 28 August 1991. The number of participating agencies (190) and the legal requirement on school districts to deposit with the county treasurer are at pp. 15 and 50.

securities against \$7.6 billion of deposits, \$2.70 for every dollar deposited; \$13 billion had been bought with borrowed money.¹³

The return came from the difference between the interest the longer securities paid and the short-term rate the pool paid on its repos. It was increased by a second bet on the same outcome: a third of the portfolio was in notes whose interest payments moved opposite to short-term rates, rising when rates fell and falling when they rose (“inverse floaters”), and which therefore paid more than ordinary notes for as long as rates stayed low. Nothing was hedged. In his September 1993 report to the Board, Citron said that the pool was leveraged about two to one, that the reverse repurchase agreements added about two and a half percentage points to its yield, that the strategy assumed interest rates would stay low for the next three years, and that in his opinion there was no risk of loss of principal.¹⁴

The county had come to depend on the yield. After the state shifted property tax away from counties in 1992, Orange County did not cut its spending; it budgeted interest earnings instead.¹⁵ Interest had supplied 7.4% of the part of the county’s budget over which it had any choice in 1991–92; for 1994–95 it was budgeted to supply 35%, the largest single source, while property tax fell from 53% to 25%.¹⁶ To earn more of it the county borrowed: \$400 million of one-year notes in July 1993 and \$600 million in July 1994, issued, in the words of the later SEC investigation, “for the purpose of reinvesting the proceeds in the County Pools,” and twelve other public bodies, among them cities and school districts, issued a further \$562 million in 1994 to do the same.¹⁷ The county’s own auditor warned in 1993 that budgeting this way was “not fiscally responsible” and in 1994 that the county could not rely on interest income “for the long term”; the Supervisors approved each note issue as routine business, without discussion, and none of them later recalled reading a disclosure document.¹⁸ In the spring of 1994 Citron’s opponent in the election for treasurer, John Moorlach, said publicly that the strategy was too

¹³ State Auditor, pp. 16 and 35. Leverage over the period January 1991 to November 1994 ranged from 1.6 to 2.9 (p. 35).

¹⁴ Securities and Exchange Commission, *Report of Investigation in the Matter of County of Orange, California, as it Relates to the Conduct of the Members of the Board of Supervisors*, Exchange Act Release No. 36761, 24 January 1996, p. 14, summarising the treasurer’s annual financial statement of September 1993. The composition of the portfolio on 30 November 1994, at least \$6.6 billion (32%) in inverse floaters and \$8.3 billion (over 40%) in structured notes of all kinds, is from the State Auditor, p. 43; the absence of hedging is at p. 44.

¹⁵ Legislative Analyst’s Office, *A Review of the Orange County Recovery Plan as Proposed August 22, 1995*, 1 September 1995, p. 8: “Orange County did not significantly reduce expenditures following the property tax shift to schools beginning in 1992–93. Instead, the County was able to avoid these cuts by adopting high risk/high return investment practices and using the interest earnings to balance its general fund until last year.”

¹⁶ SEC, Report of Investigation, pp. 6–7 and nn. 16–18. Of the \$462.5 million discretionary budget for 1994–95, \$162 million was budgeted to come from interest on the county’s deposits in the pool.

¹⁷ SEC, Report of Investigation, pp. 7–9 (the \$600 million 1994–95 Taxable Notes of 8 July 1994 were “to raise funds to reinvest in the County Pools for profit”); SEC Litigation Release No. 14792, 24 January 1996 (the \$400 million 1993–94 Taxable Notes of 1 July 1993); State Auditor, Table 2, p. 17, listing the twelve other issuers and their \$562.2 million.

¹⁸ SEC, Report of Investigation, pp. 12–14 and n. 21. The treasurer had stopped submitting the monthly investment reports required by state law in 1991, and the Board had not required him to resume (p. 15).

risky for public funds. The Supervisors were aware of the criticism and made no inquiry, and Citron was re-elected.¹⁹

The Federal Reserve raised its policy rate six times in 1994, from 3% at the start of the year to 5.5% in November.²⁰ The pool's borrowing cost rose, the interest on its inverse floaters fell, and its securities lost value. On 1 December the county announced that the portfolio had lost about \$1.5 billion of its value; Citron resigned three days later; and when the dealers declined to renew the repurchase agreements and twelve of them began selling the securities they held, the Board filed for bankruptcy on 6 December.²¹ The portfolio was sold off over the following weeks and the loss was fixed at \$1.69 billion.²² The consultants engaged by the state auditor calculated afterwards that the interest-rate rises of 1994 alone implied a loss of 22% of the depositors' money, and that a further rise of one percentage point at the end of November would have cost another \$560 million.²³

The depositors received 77 cents on the dollar from the liquidation in May 1995 and were told that the rest depended on lawsuits.²⁴ The county asked its voters for a half-cent sales tax and was refused, 61% to 39%, on 27 June 1995; the state declined to help. The county cut the spending it financed from its own revenues by 41%, from \$463 million to \$275 million, eliminated about 2,500 positions, and had \$38 million a year of transportation sales tax diverted to it for fifteen years; the budgets for social services and health were cut by a quarter.²⁵ It sold \$880 million of recovery bonds in June 1996 and paid off the last of the debt in 2017.²⁶ Citron pleaded guilty to six felonies, two of them false statements in the sale of securities, and

¹⁹ SEC, Report of Investigation, n. 23: "The Supervisors were aware of the criticism. The public criticism, however, did not prompt any inquiry or review by the Supervisors." Moorlach was appointed to serve out the treasurer's term in March 1995 (State Auditor, p. 19; California State Senate, member biography of John M. W. Moorlach).

²⁰ Board of Governors of the Federal Reserve System, open market operations archive: the federal funds target was raised on 4 February, 22 March, 18 April, 17 May, 16 August and 15 November 1994, and again to 6% on 1 February 1995.

²¹ State Auditor, pp. 17–18 ("the board of supervisors filed for bankruptcy protection because investment bankers declined to renegotiate or renew existing reverse repurchase agreements"); *In re County of Orange* (Federal National Mortgage Association v. County of Orange), 183 B.R. 609 (Bankr. C.D. Cal. 1995), statement of facts and n. 13, listing the twelve firms that sold their collateral. Citron's resignation is dated 4 December by the State Auditor (p. 17).

²² State Auditor, p. 19: an initial estimate of \$2.02 billion in December 1994, revised to \$1.69 billion in January 1995. The county's own figure after liquidation was \$1.64 billion.

²³ State Auditor, pp. 46–47: "the actual changes in interest rates that occurred during 1994 would have caused a 22.2 percent loss to the participants' original investment in the portfolio"; the duration of the base portfolio was 7.4, against 1.8 for comparable funds.

²⁴ Legislative Analyst's Office, p. 1; California State Auditor, *Report of the Orange County Restructuring Plan*, Letter Report 95107, 22 May 1995, p. 2. Recovery notes issued in June 1995 brought school districts to 90 cents (LAO, p. 1).

²⁵ Legislative Analyst's Office, pp. 4 and 8–9 (spending cuts, positions, the \$38 million a year of Transportation Development Act sales tax for fifteen years from 1996–97); Mark Baldassare, *When Government Fails: The Orange County Bankruptcy*, Public Policy Institute of California, 1998, occasional paper summary, p. 18 (community and social services cut 27%, health services 25%). Measure R, the half-cent sales tax, was defeated on 27 June 1995 by 61% to 39%; the State Auditor's letter report of 22 May 1995 (pp. 5–6) shows that the county's recovery plan as then drawn depended on it.

²⁶ Baldassare, p. 6 (the June 1996 bonds; the county left bankruptcy on 12 June 1996). The recovery debt was refinanced in 2005 and the final payment on the Lease Revenue Refunding Bonds, Series 2005, fell due on 1 July 2017: County of Orange, news release, June 2017; *Bond Buyer*, 4 April 2017.

was sentenced to a year in jail and a fine of \$100,000.²⁷ Merrill Lynch, which the county had sued for \$2 billion over the securities it had sold the pool, paid \$400 million in June 1998, and the county's claims against the banks, its auditors and its advisers were settled in all for about \$865 million.²⁸ The district judge who supervised that litigation noted that the gross loss was about \$1.6 billion, "but, after off-setting the profit the Treasurer had earlier made under the scheme, the net loss was arguably less than \$900 million."²⁹

The Orange County pool and the TFIF take their risk in different places. Citron's spread was a term spread: he borrowed short and lent long, in paper that carried no credit risk, and lost when the short rate rose. The TFIF's spread is a credit spread: it borrows for years at 150 bps or so over Treasuries and lends to sovereigns rated around BB, and it loses when they default or their bond prices fall. What the two have in common is not the bet but the arithmetic around it, and two parts of that arithmetic are worth stating. First, the judge's footnote. The pool's earlier profits were real, and they would have covered nearly half of the loss; they had been spent, as budgeted revenue, in the years they were earned, so the loss fell whole on depositors, employees and services. The TFIF's Forest Payments are the same kind of income: paid out in the years the spread is earned, and not recoverable when it is not, so that the loss in a bad year is met from sponsor capital rather than from the good years that preceded it, which is what Section 8.4 shows. Second, the consultants' figure of 22%. The securities themselves lost about 8% of their value in 1994; because there were \$2.70 of them for every dollar of deposits, that was 22% of the depositors' money. The TFIF's leverage on its sponsors' capital is five: \$100 billion of bonds on \$25 billion of sponsor loans. Section 8.3.2 notes that the emerging-market index fell by 29% in 2008; on a \$125 billion portfolio that is \$36 billion, and it more than exhausts the sponsors' \$25 billion. In both cases the public money is the junior layer. The dealers who had lent to the Orange County pool were repaid in full out of the securities they held, and the depositors bore the loss; the TFIF's sponsors stand where the depositors stood, and its bondholders where the dealers did.

9.4 Norway's Terra municipalities, 2007

Between 2001 and 2007 eight Norwegian municipalities borrowed money in order to invest it, and lost most of what they borrowed. The borrowing was arranged by a firm of financial advisers, Terra Securities, and took the form of what the contracts called a zero-coupon swap: a bank paid the municipality a lump sum, and the municipality paid it back over ten or twelve years in quarterly instalments and a final repayment of principal. The lump sum was calculated as the present value of a stream of public revenue, usually the municipality's income from hydroelectric power, but the revenue was not pledged to the bank and the obligation to repay did not depend on it. When the arrangement reached an English court, the judge found that the

²⁷ Plea of 27 April 1995 to two counts under the Corporations Code and four under the Penal Code (*San Francisco Chronicle*, 28 April 1995); sentence of 19 November 1996 (Czuleger J.), one year in county jail, five years' probation and a \$100,000 fine (CNN, 19 November 1996).

²⁸ Settlement of 2 June 1998, without admission of liability, of the county's \$2 billion suit (Associated Press, 3 June 1998); *County of Orange v. Merrill Lynch & Co. (In re County of Orange)*, 241 B.R. 212 (C.D. Cal. 1999) (Taylor J.): "Eventually, all the liability claims were settled for about \$865 million."

²⁹ *County of Orange v. Merrill Lynch & Co.*, 241 B.R. 212, n. 20.

expected income “served as no more than the basis of the calculation of the amount to be advanced,” that the bank “is given no security over any assets or revenue streams,” and that “properly understood, the municipalities were simply borrowing money in order to invest it in the financial markets.”³⁰ Haugesund, a town of 33,000, borrowed NOK 231 million in 2004; Narvik, a town of 18,000, borrowed NOK 190 million in 2005.³¹ The eight together put NOK 1.5 billion, about \$260 million, into the products Terra sold them.³²

The purpose was to earn a spread, and the people who did it said so. Narvik’s finance officer, in a paper to the council in 2005, explained that “in that the Municipality’s credit rating enables the Municipality to obtain cheaper credit than others, and at the same time place investments on the same terms, this can be exploited to gain additional dividends.” The municipality would pay about 4.5% on the money and “place” it at about 6%; “the additional revenues earned by the Municipality result from the difference in the interest rates for these two alternatives.”³³ When councillors asked why this was not simply a loan, he answered in writing that “by that very fact that the municipality can borrow cheap, it gives us an opportunity to place the money to a higher interest rate than what we borrow,” that the margin would yield NOK 1.3 to 1.6 million a year, less about NOK 1 million in fees, and that “in financial circles one usually name such arrangements as ‘free lunch’.”³⁴ The sole purpose of the transaction was “to make a turn on the amount advanced by Depfa, by investing it at a greater risk than the risk which Depfa was accepting,” and the risk “was Narvik’s and Narvik’s alone”: if the investment failed the municipality would have to repay the bank out of its other assets.³⁵

The municipalities could borrow at 4.5% because they were public bodies with a taxing power behind them, and the 1.5 percentage points they set out to earn was the difference between the price of their credit and the price of the risk they bought with it. The party that borrows cheaply bears the loss when the riskier borrower fails to pay, and the lender has been promised repayment whatever happens to the investment.

What they bought with the money was American corporate credit risk, in increasingly concentrated forms. Haugesund’s money went first into a credit-linked note, a security whose return depended on none of 23 companies defaulting. In 2005 Terra offered a note referenced to 125 companies, “presented by Terra as an opportunity to increase the total annual cash flow from the [credit-linked note] by 50%,” and Haugesund took it; when one of the companies

³⁰ *Haugesund Kommune and Narvik Kommune v Depfa ACS Bank* [2009] EWHC 2227 (Comm), paras. 73 and 77 (Tomlinson J). Depfa ACS Bank, an Irish bank specialising in public-sector lending, was the lender to Haugesund and Narvik; DnB Markets, a Norwegian bank, lent to the others.

³¹ [2009] EWHC 2227 (Comm), paras. 34 and 58. Depfa paid Haugesund NOK 231.3 million on 1 July 2004 against 31 quarterly payments and a final payment of NOK 216 million in 2012, later extended to 2013; it paid Narvik NOK 190 million on 14 September 2005 against quarterly interest at three-month NIBOR plus 0.12% and repayment of the NOK 190 million in 2017. Populations are Statistics Norway figures for 1 January 2008.

³² Advokatfirmaet Lund & Co, *Sluttrapport om Terra-saken* (final report on the Terra affair, prepared for Bremanger municipality), 5 August 2021, p. 66: NOK 1,518 million invested by Rana, Narvik, Bremanger, Haugesund, Hattfjelldal, Vik, Hemnes and Kvinesdal. Dollar figures use Norges Bank’s average exchange rate for 2007, NOK 5.86 to the dollar.

³³ [2009] EWHC 2227 (Comm), para. 49, quoting the paper presented to Narvik’s council in 2005.

³⁴ [2009] EWHC 2227 (Comm), para. 50. The judge noted that the officer’s statement in the same answer that the property taxes were “security for the loan” was mistaken, since the bank took no security.

³⁵ [2009] EWHC 2227 (Comm), para. 60.

defaulted within months, Terra proposed replacing the note with a collateralised debt obligation or “CDO”, described as “more secure and flexible,” whose portfolio a manager unknown to the municipality could change at will.³⁶ The town of Narvik followed the same path for the same reason, because the note’s margin over its borrowing cost was 0.72 percentage points and the CDO promised more.³⁷ In the summer of 2007 Terra went a step further. It pledged the CDOs themselves, in place of cash, as collateral for notes linked to a Citigroup fund that bet on the relationship between American municipal bond yields and the interbank lending rate, on terms that allowed the fund position to be many times the collateral; by the end of August it stood at seven times.³⁸ Each step was taken to close the gap between what had been promised and what the previous product was earning.

The crash came within weeks of that last step. In August 2007 the American subprime mortgage market failed and credit markets seized: the prices of corporate credit and of structured products fell together, and the Citigroup fund, which depended on municipal bond yields moving with the interbank rate, lost value from the first weeks of the month. A fund geared seven times against collateral that was itself losing value could not absorb this. Terra’s first demand that the municipalities put up more collateral arrived in August 2007, for NOK 24.3 million; Hattfjelldal’s chief executive recalled the telephone call two days later, telling him that the investments had fallen so far that the municipality must pay in “many millions” as security, and his reaction that “something like that should not have been able to happen.”³⁹ In November the Norwegian financial regulator gave Terra formal notice that it intended to revoke its licence “on the grounds of its systematic violation of its duties”; Terra petitioned for bankruptcy the next morning, and Citigroup closed the fund and sold what was in it.⁴⁰ In January 2008 the county governors, exercising their power to review the legality of municipal decisions, annulled the resolutions under which the investments had been made and directed that the remaining securities be sold. Haugesund’s CDO was redeemed at 42.5% of its face value in February 2008,

³⁶ [2009] EWHC 2227 (Comm), paras. 36–39. The defaulting company was Delphi Corporation; the loss was NOK 3.5 million. The judge found that the CDO “involved significant financial risk, and was therefore made in breach of section 52.3 of the Act.”

³⁷ [2009] EWHC 2227 (Comm), paras. 61–64.

³⁸ Kredittilsynet (the Financial Supervisory Authority of Norway), *Forhåndsvarsel om tilbakekall av tillatelse* (advance notice of revocation of licence), ref. 07/10508, 27 November 2007, quoting Terra Securities’ own valuation of 5 November 2007: at the end of August 2007 the value of the investments in the fund was seven times the value of the collateral posted, and the terms permitted ten times. The fund was the TOB Capital Municipal Portfolio, a sub-fund of Citigroup Alternative Investments, sold to the municipalities as “Kommunefondet”; its strategy is described in Lund & Co, *Sluttrapport*, 2021, pp. 66–69.

³⁹ Lund & Co, *Sluttrapport*, 2021, for the collateral call of 17 August 2007; Odd Dale, former chief executive of Hattfjelldal, open letter of 27 August 2015 (translation ours), for the call of 19 August.

⁴⁰ [2009] EWHC 2227 (Comm), para. 4; Kredittilsynet, 27 November 2007. The regulator’s document was a formal warning with a deadline for reply; Terra petitioned for bankruptcy on 28 November, before any revocation. The story was broken by *Finansavisen* on 31 October 2007; Citigroup closed the fund on 30 November: Lund & Co, *Sluttrapport*, 2021.

and Narvik's was sold at 25.1% in March, at the bottom of the market.⁴¹ Of the NOK 1.5 billion the eight had invested, NOK 552 million came back, a loss of 64%.⁴²

The councils that approved the transactions had not understood them, and the record is candid about it. Haugesund's chief councillor gave unchallenged evidence that "he did not understand either the structure or the details of the deal proposed," that he supported it because his administration and Terra recommended it, and that he "derived the impression that the level of risk was very low, little more than that involved in depositing the funds in a savings bank"; the resolution passed unanimously after "very little discussion."⁴³ Terra's slides had said that "a high expected return will include a high risk," but Haugesund's head of finance testified that the risk "was always presented as being very small."⁴⁴ Narvik's finance officer, the judge found, "gave absolutely no independent consideration to the proposal and was prepared simply to do what was suggested by Terra."⁴⁵ Hattfjelldal, with 1,463 inhabitants, had borrowed and invested NOK 103 million; its chief executive wrote later that nobody involved "had any motive beyond securing, at close to zero risk, an income opportunity worth roughly one nurse's salary a year."⁴⁶

The loans had to be repaid in full,⁴⁷ and the cost fell on the residents over a long period. Norwegian law required a municipal deficit to be covered within four years; seven months after the collapse Parliament gave the minister power to extend that to ten years, subject to placing these municipalities under state supervision.⁴⁸ Six of the eight municipalities were under supervision for between six and fourteen years.⁴⁹ Bremanger's exposure had been NOK 95,000 for every inhabitant, about \$16,000; Hattfjelldal lost 86% of what it had invested; across the

⁴¹ [2009] EWHC 2227 (Comm), paras. 41 and 65. The county governor of Rogaland annulled Haugesund's investment resolutions by letter of 21 January 2008; the chief administrative officer of Nordland annulled Narvik's on the same day. Haugesund's loss on the CDO was about NOK 125 million; Narvik's was NOK 142.3 million on an investment of NOK 190 million.

⁴² Lund & Co, *Sluttrapport*, 2021, p. 66: NOK 1,518,184,698 invested, NOK 551,701,467 recovered from the investments, a loss of NOK 966,483,231 or 63.7%.

⁴³ [2009] EWHC 2227 (Comm), para. 31. The chief councillor was Petter Steen.

⁴⁴ [2009] EWHC 2227 (Comm), para. 29.

⁴⁵ [2009] EWHC 2227 (Comm), para. 60.

⁴⁶ Dale, open letter, 27 August 2015 (translation ours). Hattfjelldal's investment was NOK 103.0 million and its loss NOK 88.3 million: Lund & Co, *Sluttrapport*, p. 66.

⁴⁷ Haugesund and Narvik obtained a declaration from the English court that the swaps were void, because they had lacked the power to enter into them, but were ordered to repay the sums advanced; the judge called it "a Pyrrhic victory." [2009] EWHC 2227 (Comm), paras. 70, 77 and 182; *Haugesund Kommune v Depfa ACS Bank* [2010] EWCA Civ 579 (Aikens LJ), dismissing the municipalities' cross-appeal on change of position. Depfa's claims at termination were NOK 232.4 million against Haugesund and NOK 204.0 million against Narvik, plus interest; the municipalities had recovered NOK 96.8 million and NOK 47.7 million from the investments ([2009] EWHC 2227 (Comm), paras. 45–46 and 67–68). Bremanger's related challenge to interest-rate options it had sold to Danske Bank failed in the Supreme Court in 2016: *Danske Bank v Bremanger kommune*, HR-2016-476-A, 29 February 2016.

⁴⁸ Lov 27. juni 2008 nr. 69, amending kommuneloven §48 nr. 4 and §60. The extension had been agreed in principle at a meeting between the eight municipalities and the Minister of Local Government in January 2008: Lund & Co, *Sluttrapport*, 2021, p. 9.

⁴⁹ Kommunal- og distriktsdepartementet, ROBEK register 2001–2025. Vik had entered the register in July 2007, before the affair became public, and left it in May 2016; Bremanger entered in June 2008 and left in June 2022, its stay prolonged by the Danske Bank options described in note 47, which run to 2036; Hattfjelldal, Narvik, Hemnes and Haugesund spent between six and eight years on it. Rana and Kvinesdal were never registered.

eight municipalities, the loss was NOK 10,000 per resident.⁵⁰ Narvik turned off the street lights on the state roads through the town in November 2008 and left them off for five years.⁵¹ Most of the money, though, did not come from cuts. Vik, which had to find NOK 112 million, raised NOK 40 million by extending property tax to houses and holiday homes and received NOK 30 million in discretionary grants from the state.⁵²

The Norwegian response was to change the rules on municipal financial management. A municipality must now take independent advice on any financial arrangement in which its adviser has an interest, and its financial regulations must be assessed by an independent expert before they are adopted.⁵³ The principle is that the party that profits from a public body's decision to buy risk should not be the party that explains the risk to it.

The municipalities' spread was the difference between the price of public credit and the price of the risk bought with it, and it was earned only until the risk arrived; then the borrowed money was gone and the loans remained. Two points bear stating for the TFIF. First, the loss was made permanent by forced sales at the bottom of the market, ordered by lenders and supervisors who could not wait for prices to recover. In the case of the TFIF, sponsor countries may bring patient capital, but market investors with maturing bonds will not wait: they will require repayment even if the fund is forced to crystallise losses by selling at the bottom of the market, which is what the refinancing test in Section 8.4 does to the simulated funds in every crisis. Second, the municipalities accepted the arrangement because the risk was presented to them as very small; Haugesund's chief councillor thought it "little more than that involved in depositing the funds in a savings bank." Concept Note 3.1 makes claims of the same kind. Its Monte Carlo simulation puts the probability that sponsors suffer a capital impairment at between 0.24% and 1.14%, depending on the portfolio, without saying over what period, and concludes that "the income over time from the investment portfolio is expected to meet the targets of the TFIF for enabling the Facility to make Forest Payments to TFCs and repay Sponsor Junior Investment."⁵⁴ Chapter 8 found sponsor capital completely exhausted in eleven of nineteen launches, and impaired in all of them. The Note adds that its analyses are "just examples" and that the actual portfolio "will not likely be identical."

9.5 Germany's Landesbanken, 2007

The Landesbanken are the wholesale banks of the German states, owned by the states and their savings banks, and until 2005 the states guaranteed their debts without limit. The guarantee,

⁵⁰ Lund & Co, *Sluttrapport*, 2021, p. 66, and Statistics Norway population figures for 1 January 2008: Bremanger invested NOK 369.2 million with 3,894 inhabitants; the eight together invested NOK 16,000 and lost NOK 10,200 per inhabitant.

⁵¹ Narvik municipal council, budget resolution of 18 December 2008; the lights were switched off from 6 November 2008, to save about NOK 300,000 a year.

⁵² The breakdown given by Vik's chief executive, Oddbjørn Ese, on the municipality's exit from the register in April 2016.

⁵³ Forskrift om kommuners og fylkeskommuners finansforvaltning (regulation on municipal financial management), 2009.

⁵⁴ Concept Note 3.1, §7.6, pp. 42–43, and Table 6, which gives probabilities of a sponsor capital impairment of 1.14%, 0.68% and 0.24% for portfolios with 0%, 10% and 25% of assets outside ODA-eligible countries.

known as *Gewährträgerhaftung*, meant that a Landesbank could borrow at close to the sovereign's rate. The European Commission treated it as state aid, and under an agreement of July 2001 it ended on 18 July 2005, with debt issued before that date still covered until the end of 2015.⁵⁵ What the banks did with the privilege in its last years was described to the Schleswig-Holstein parliament's inquiry by Wolfgang Peiner, a former finance senator of Hamburg who had chaired the board of one of them: "thanks to the guarantor's liability the Landesbanken could refinance themselves cheaply. The liquidity was used to build a portfolio with a higher yield. The interest spread thereby earned contributed substantially to the institutions' economic result."⁵⁶ The banks borrowed as much as they could before the deadline; in the first half of 2005 HSH Nordbank raised guaranteed debt "in a kind of last-minute panic."⁵⁷

Sachsen LB, founded in Leipzig in 1992, was the smallest of them, and it went furthest. In September 2001 its management proposed converting it into a capital-markets bank concentrated on "asset swap business," against the advice of the consultants it had engaged and of one of its own directors, whose dissent recorded that the model offered no assurance of a diversified balance sheet, that margins on the business would fall sharply from 2005, and that no numerical check of the plan's effects had been supplied. On 30 October 2001 the supervisory board, chaired by the state finance minister, "took note of the change of strategy with approval, although still no numerical presentation of the planning had been submitted."⁵⁸ Over the next five years capital-market business supplied 82% of the bank's operating profit.⁵⁹

The business was run from Dublin. A subsidiary there set up off-balance-sheet vehicles which bought long-dated asset-backed and mortgage-backed securities, rated AAA and largely American, and paid for them by issuing commercial paper of a month or less. The Saxon audit office's description of the model is one sentence: "the return on the business was determined by the difference in interest rates (spread) between the securities purchased and those issued."⁶⁰ The vehicles were off the bank's balance sheet, but the bank had guaranteed their liquidity and their losses, and behind the bank stood the state's guarantee. By the middle of 2007 the largest vehicle held €17 billion of securities against the bank's core capital of about €1.4 billion, and the bank's credit committee had authorised it to grow to €43 billion, which the audit office put at

⁵⁵ Commission Decision 2009/341/EC of 4 June 2008 on State aid C 9/08 implemented by Germany for Sachsen LB, OJ L 104, 24 April 2009, recital 13. The two guarantees were *Anstaltslast*, the owner's duty to keep the institution solvent, and *Gewährträgerhaftung*, the owner's direct liability to creditors.

⁵⁶ Schleswig-Holsteinischer Landtag, *Bericht und Beschlussempfehlung des Ersten Parlamentarischen Untersuchungsausschusses HSH Nordbank*, Drucksache 17/1675, 15 August 2011, p. 41 (translation ours).

⁵⁷ Drucksache 17/1675, p. 242.

⁵⁸ Sächsischer Rechnungshof, *Sonderbericht nach § 99 SÄHO: Landesbank Sachsen Girozentrale*, March 2009, Az. 120308/64, pp. 27–28 (translation ours). The finance minister chaired the supervisory board and, under the committee's rules, its credit committee, and was at the same time the minister responsible for supervising the state's holding (pp. 50 and 55).

⁵⁹ Sonderbericht, p. 10: capital-market activities accounted on average for 82% of operating profit in 2002–2006.

⁶⁰ Sonderbericht, p. 40. The Dublin subsidiary, Sachsen LB Europe plc, was formed in September 1999 (p. 30); the Commission describes it as "until mid-2007 the main source of profits for the Sachsen LB group" (Decision 2009/341/EC, recital 12).

“nearly three times the state budget.”⁶¹ Of the thirty largest sponsors of such vehicles in the world, Sachsen LB was the one whose exposure was largest relative to its capital.⁶²

The spread was a product of the guarantee. From 2005 the margins fell, as the dissenting director had said they would, and the bank’s response was to expand the business rather than reconsider it. The audit office found that the bank had deliberately used the grandfathering of the guarantee, in the belief that it could keep earning the spread until 2015, and concluded that “without the use of grandfathering the business model would not have been profitable,” that after 2015 it would have earned nothing, and that “although the transactions were profitable only because of the state guarantees, the bank kept expanding their scale.”⁶³

The bank was warned. The financial regulator examined it in 2005, as a follow-up to an examination in 2002, and found serious defects in its risk control: no documentation from which an expert could establish what the Dublin vehicles held or what their risks were, and a liquidity risk, in the event of a market disturbance, from funding long assets with short paper. It “established that the business model presupposed that market disruptions would never occur,” and wrote to the chairman of the supervisory board to say so.⁶⁴ Three weeks after the board had discussed the regulator’s findings, a director of the bank’s holding company told the state parliament’s finance committee that an outside review had found “no risks in Leipzig and Dublin; in Dublin in particular the bank does essentially AAA business,” and the finance ministry, which knew what the regulator had said, offered no correction.⁶⁵

The bank had a risk limit, and it could not be used. The vehicles’ rules required a security to be sold if its price fell to 97% of cost. On €17 billion of securities that meant realising a loss of about €519 million, against core capital of €1.4 billion: “given the dimension of the business, selling the securities would have meant the end of the bank.” The audit office could not establish what reasoning had produced a trigger “whose observance would have had the end of the bank as its consequence.” The bank had never calculated the maximum exposure it could bear, and “ignored the risk arising from the scale of the business in the event of market disruptions, because mathematical calculations excluded the occurrence of market crises with high probability.”⁶⁶

⁶¹ Sonderbericht, pp. 10, 37 and 41–42. The vehicle was Ormond Quay, which held €17.3 billion; the group’s capital-market book as a whole was about €41 billion. The €43 billion figure follows from the €1.7 billion liquidity line the credit committee had approved for it.

⁶² Viral V. Acharya, Philipp Schnabl and Gustavo Suarez, “Securitization without Risk Transfer,” NBER Working Paper 15730, February 2010, Table 13 and pp. 37–38: on Moody’s data for 1 January 2007, Sachsen LB’s asset-backed commercial paper exposure of \$12.5 billion against Tier 1 capital of \$1.3 billion meant that, had the vehicles been on its balance sheet, it would have needed additional capital equal to 79.9% of what it had, the highest proportion of the thirty largest sponsors; the average was 6.1%. “The bank with the largest exposure, Sachsen Landesbank, was the first large bank to be bailed out on 17 August 2007 because it was unable to provide the credit guarantees it had extended to its conduits.”

⁶³ Sonderbericht, pp. 46–47.

⁶⁴ Sonderbericht, pp. 43–44 and 47. The examination was under §44 of the Banking Act; the audit office regarded the breaches as “particularly serious” because the 2005 examination was a follow-up to a special examination in 2002.

⁶⁵ Sonderbericht, pp. 90–91. The statement was made to the Haushalts- und Finanzausschuss on 6 July 2005; the credit committee had discussed the regulator’s findings on 16 June 2005, and the audit office found it “surprising” that the finance ministry offered “not a hint or a qualification” of the statement.

⁶⁶ Sonderbericht, pp. 42 and 46.

The crisis arrived in August 2007. Investors stopped buying commercial paper backed by American mortgages; the vehicles could not refinance themselves, the commercial banks withdrew their lines, and the vehicles turned to Sachsen LB for up to €17 billion of liquidity that the bank did not have.⁶⁷ On 10 August the bank announced that it had no liquidity problems. A week later it was insolvent but for the other Landesbanken, which on 17 August undertook to buy up to €17 billion of the vehicles' paper that nobody else would take.⁶⁸ One of the bank's refinancing partners then demanded €250 million of additional collateral; to raise it the bank sold the assets of a fund that had been bought for €200 million and received a mere €11.5 million, about 5%.⁶⁹ On 26 August the state placed the bank under the management of the Baden-Württemberg Landesbank, LBBW, which agreed to buy it for a price to be fixed once the markets had settled, with a floor of €300 million, and paid €250 million at once to keep the bank solvent. The markets did not settle. By December the securities in the vehicles were showing losses that would have taken the bank below its minimum capital, and the sale could be completed only by moving €17.5 billion of them into a new vehicle, financed by LBBW and the other Landesbanken, with the Free State of Saxony guaranteeing the first €2.75 billion of losses. The state parliament approved the guarantee on 20 December 2007. The bank changed hands for €328 million.⁷⁰

The state and its savings banks had put €692 million into the bank, so the audit office counted the sale as a loss of at least €364 million, of which €178 million fell on the Saxon municipalities through their holding company.⁷¹ The guarantee was then drawn on for a decade as the securities were sold off. By the end of 2017 Saxony had paid out about €1.86 billion under it, so that the affair cost the state and its municipalities some €2.2 billion, in a state whose annual budget at the time was about €15 billion.⁷²

The audit office's report, delivered to the state parliament in March 2009, refused the excuse that everyone had been caught by the same storm: "the financial crisis is not the cause of the enormous damage, but the consequence of the unprofessional and careless action of many actors in the financial market." The supervisory board had a continuing duty to inform itself about the bank's position and to oversee the credit committee's decisions on transactions that threatened its existence: "it failed in this task." The credit committee "ignored the danger to the bank arising from the rising volume," never asked to see the relationship between return and risk, and "had the committee members had the consequences of market disruptions set out for

⁶⁷ Decision 2009/341/EC, recitals 9–10 and 18: Ormond Quay "was unable to refinance itself and was in need of liquidity of up to EUR 17,1 billion in order to avoid fire sales."

⁶⁸ Sonderbericht, p. 13; Decision 2009/341/EC, recitals 19–22. The pool contract, signed by ten Landesbanken and DekaBank, committed them to buy up to €17.1 billion of Ormond Quay's commercial paper for six months if it could not be placed; it was announced on 17 August and signed on 19 August 2007.

⁶⁹ Sonderbericht, pp. 13–14, on the findings of the auditors Ernst & Young.

⁷⁰ Decision 2009/341/EC, recitals 23–37; Sonderbericht, pp. 13–14. LBBW's €250 million was paid to the shareholders and injected by them into the bank. The final price of €328 million was net of a €500 million deduction for expected losses on the €11.8 billion of structured investments that remained in the bank.

⁷¹ Sonderbericht, pp. 10 and 22–23. The state's own share of the loss was at least €186 million.

⁷² Sächsisches Staatsministerium der Finanzen, press release of 17 January 2018: payments under the guarantee of about €1.86 billion to 31 December 2017, with about €890 million of the €2.75 billion remaining and the portfolio, of about €4.2 billion nominal, almost entirely sold. The state budget comparison follows the audit office's own: a €43 billion exposure was "nearly three times the state budget" (Sonderbericht, p. 10).

them, they would have recognised the risk of volumes of business that bore no justifiable relation to the bank's equity base."⁷³

Sachsen LB was the first to fall and the smallest. Every large Landesbank had done the same thing on a larger scale, and one estimate of what their rescues cost the public is €40 billion.⁷⁴ Heide Simonis, who had been minister-president of Schleswig-Holstein and chaired the supervisory board of HSH Nordbank, told the inquiry: "I think none of us knew what the abolition of the guarantor's liability by the public sector would mean... I never really had the full 60 billion properly in my head, I must tell you honestly." The state's liability under the guarantee when she left office was not €60 billion but more than €160 billion. She also said: "we were drunk on success."⁷⁵

The same banks, in the same years, were selling German towns a product called the spread ladder swap, a bet on the shape of the yield curve presented as a way of reducing interest costs. The town's gain was capped and its loss was not. In 2011 the Federal Court of Justice held that a bank advising a customer on such a contract must ensure that the customer has "essentially the same state of knowledge as the bank advising him," because only then can he decide for himself whether to accept "the interest-rate bet he is being offered"; that Deutsche Bank had "deliberately structured" the contract's risk "to the investor's detriment," so as to sell on, the day the contract was struck, the risk the customer had taken on its advice; and that while the customer's loss was unlimited, the bank's was "narrowly limited from the outset."⁷⁶ Nobody knows how many public bodies bought these contracts or what they lost. Asked in 2010, the federal government had "no information of its own, going beyond press reporting, on speculative derivative transactions by municipalities," and the Bundestag's own summary of its hearing on the subject in 2011 was headed "no detailed information on municipalities' interest-rate bets." Pforzheim, a city of 120,000, told the hearing it had lost about €56 million; Deutsche Bank told it that two thirds of the transactions had been initiated by the municipalities.⁷⁷

The counter-evidence should be stated. When Pforzheim's former mayor and treasurer were convicted of breach of trust in 2017, the presiding judge said: "the contracts said clearly that unlimited risks were involved. You did not buy an Easter egg and then get delivered a hand grenade. You knew hand grenades were involved and merely hoped they would not go off." The mayor was a trained financial administrator and the treasurer a mathematician.⁷⁸ The

⁷³ Sonderbericht, pp. 10–12 and 55 (translation ours).

⁷⁴ Bürgerbewegung Finanzwende, "Das Drama der Landesbanken," 6 December 2019, which puts the rescues of Sachsen LB, LBBW, WestLB, BayernLB, HSH Nordbank and Nord/LB at €40.3 billion in total. The figures are compiled from public sources and are estimates.

⁷⁵ Drucksache 17/1675, p. 288 (translation ours). The inquiry's report notes that at the time of her resignation in 2005 the guarantee stood not at €60 billion but at over €160 billion.

⁷⁶ Bundesgerichtshof, judgment of 22 March 2011, XI ZR 33/10, BGHZ 189, 13. The contract had a notional amount of €2 million and an initial negative market value to the customer of about 4% of it, some €80,000, which the bank had not disclosed; the customer was awarded €541,074.

⁷⁷ Deutscher Bundestag, Drucksache 17/2683, answer of the Federal Government of 23 July 2010 to question 2 of Drucksache 17/2573 (translation ours); Deutscher Bundestag, "Keine Detailangaben zu Zinswetten von Kommunen," report on the public hearing of the Finanzausschuss of 6 April 2011.

⁷⁸ Landgericht Mannheim, judgment of 21 November 2017, as reported in *taz*, 22 November 2017 (translation ours). The presiding judge was Andreas Lindenthal; the former mayor, Christel Augenstein, received a suspended sentence

convictions were quashed on appeal the following year and, as in every such prosecution in Germany, no conviction stands.⁷⁹ The point is not that the buyers could not read the contracts. It is that the contracts could not be valued by the buyers at all, only by the bank that had priced them, and that a public body, which cannot go bankrupt, is the natural buyer of a contract whose downside is unlimited.

What the Landesbanken show is where a spread of the TFIF's kind comes from. They borrowed cheaply because a state stood behind them, and the spread they earned was not something they had found in the market; it was the value of the state's guarantee, and when the guarantee ended, the audit office found, the business could not have been profitable. The TFIF's spread has the same origin. Its market borrowing is cheap because \$25 billion of subordinated sponsor loans absorb the first losses, and the sponsor loans are cheap because the sponsors lend at the Treasury rate. What the fund earns over its cost of capital is the value of the sponsors' credit support, and it lasts only as long as the sponsors carry the risk that the support implies. Two further points follow. First, Sachsen LB did not fail because its securities defaulted; it failed because they could not be refinanced, and the price of that was set by a forced sale that returned 5% of cost. The TFIF must roll \$100 billion of bonds through the market, and Section 8.4 showed how refinancing can force sales of assets and a shrinking of the fund. Second, the owners approved twelve times their capital of exposure with no figures in front of them, and did not ask for any; one could argue that a finance ministry that commits to the TFIF on the strength of an untested concept note is at risk of being in a similar position.

9.6 Long-Term Capital Management, 1998

Long-Term Capital Management was a private investment partnership, founded in 1994 by John Meriwether, who had run bond arbitrage at Salomon Brothers, with partners who included two of the economists who would share the 1997 Nobel prize for the theory of option pricing.⁸⁰ Its business was to find pairs of securities whose prices had drifted apart and to bet that they would come back together. The President of the Federal Reserve Bank of New York later gave Congress an example: the fund might notice that corporate bonds were yielding more, relative to Treasuries, than they had in recent years; it would buy the corporate bonds and sell Treasuries short; "if the spread narrowed as expected, the firm would profit. If, however, the spread continued to widen, the firm would incur losses." The same bet, in many variations, was placed across the interest-rate markets of the United States, Europe and Japan, and the fund relied on

of one year and eight months, and the former treasurer, Sabine Weishaar, two years suspended. Most of the city's loss was later recovered from the banks in settlements.

⁷⁹ Bundesgerichtshof, judgment of 19 September 2018, 1 StR 194/18.

⁸⁰ President's Working Group on Financial Markets, *Hedge Funds, Leverage, and the Lessons of Long-Term Capital Management*, April 1999 (the "Working Group report"), p. 10: the fund was "founded in early 1994"; its "principals included individuals with substantial reputations in the financial markets and especially in the economic theory of financial markets." Robert C. Merton and Myron S. Scholes, partners in the firm, received the Nobel prize in economics in October 1997.

their number and variety to protect it.⁸¹ It earned, after fees, about 20% in its first year, 43% in 1995, 41% in 1996 and 17% in 1997.⁸²

The spreads it traded were small, so the returns came from borrowing. The fund financed its bonds through repurchase agreements and took much of its exposure through swaps and other derivatives, for which its counterparties, on the strength of its reputation, often required no initial margin at all.⁸³ At the end of 1997 the partners returned \$2.7 billion to their investors, cutting the fund's capital by a third to \$4.8 billion, without cutting its positions.⁸⁴ On 31 August 1998 it held over \$125 billion of assets on that capital, more than 25 to 1, and derivatives with a face value of over \$1.4 trillion; in several futures markets its positions were more than 5% of everything outstanding.⁸⁵ It told those who dealt with it that its portfolio carried about the risk of an unleveraged holding of the S&P 500 index.⁸⁶

In August 1998 Russia devalued the rouble and defaulted on its domestic debt. Investors everywhere sold whatever carried risk and bought whatever did not, and the spreads the fund had bet would narrow widened instead, in every market at once: "as markets around the world moved in the same direction at the same time, the diversification on which Long-Term had previously relied failed them utterly."⁸⁷ The fund lost \$1.8 billion in August, 44% of its capital, and told its investors on 2 September that it was seeking new money; none came. What turned the losses into a collapse was the attempt to reduce them. The positions were financed on borrowed money against collateral, and as their value fell the lenders demanded more; meeting the demands meant selling, and selling meant selling the positions the whole market knew it held, into a market in which, as the official inquiry put it, the flight to quality "made it difficult to reduce exposures quickly without incurring further losses."⁸⁸ Each sale moved prices further against the positions that remained and brought the next call. The lenders who had asked for no margin now valued what they held at the prices a forced sale would fetch; the fund lost \$500

⁸¹ Statement of William J. McDonough, President of the Federal Reserve Bank of New York, before the House Committee on Banking and Financial Services, 1 October 1998: "anticipating that some positions would move in their favor and some would move against them, the firm relied on diversification across a large number of product and geographic markets."

⁸² Working Group report, p. 11 ("approximately 40 percent in 1995 and 1996, and slightly less than 20 percent in 1997"); the year-by-year figures are from Michael Fleming and Weiling Liu, "Near Failure of Long-Term Capital Management," Federal Reserve History, 22 November 2013.

⁸³ General Accounting Office, *Long-Term Capital Management: Regulators Need to Focus Greater Attention on Systemic Risk*, GAO/GGD-00-3, October 1999, p. 41: "Initial margin requirements ... were at times zero."

⁸⁴ Working Group report, p. 11: "Despite this reduction in its capital base, however, the hedge fund apparently did not reduce the scale of its investment positions." GAO, p. 41: balance-sheet leverage of 28 to 1 at the end of 1997.

⁸⁵ Working Group report, pp. 11–12: futures contracts of more than \$500 billion, swaps of more than \$750 billion, options and other OTC derivatives of over \$150 billion; "a number of the Fund's futures positions represented more than five percent of open interest, and in a few cases, well above ten percent."

⁸⁶ Working Group report, p. 15: "Prior to this episode, LTCM maintained that the LTCM Fund's positions embodied risk similar to that of investing in the S&P 500 index on an unleveraged basis but were essentially uncorrelated with equity returns."

⁸⁷ McDonough, 1 October 1998. Working Group report, p. 12: global portfolios like the fund's "were less well diversified than assumed."

⁸⁸ Working Group report, p. 12; GAO, Table I.1, pp. 39–40 (the August loss, the letter of 2 September). Greenspan, testifying the same day as McDonough, described the alternative to rescue: "Quickly unwinding a complicated portfolio that contains exposure to all manner of risks, such as that of LTCM, in such market conditions amounts to conducting a fire sale. The prices received in a time of stress do not reflect longer-run potential, adding to the losses incurred."

million in a single day on 21 September, and the inquiry concluded that without new money it could have defaulted by the 23rd.⁸⁹

On 23 September, at the Federal Reserve Bank of New York, fourteen banks and securities firms, most of them the fund's own lenders and counterparties, agreed to put \$3.6 billion of new capital into it in exchange for 90% of it and control of its management. The original investors were left with 10%; the sixteen partners' own stake, worth \$1.6 billion at the start of the year, was worth \$30 million by November. "Not one penny of public money was spent or committed," McDonough told the House.⁹⁰ The consortium sold the positions down over the following year, had its \$3.6 billion back by the end of 1999, and wound the fund up.⁹¹ Of the \$4.8 billion of capital at the start of 1998, more than \$4 billion was gone within nine months.

Long-Term Capital Management was not a public body, and it is in this chapter for the opposite reason from the others: it shows what the strategy does when it is run by the people who understood it best, with their own money at risk. Two things follow for the TFIF. First, the mechanism. The Chapter 8 simulation notes that it "does not charge the fund anything for selling bonds in a falling market" and "does not raise the fund's own borrowing cost as its cushion thins." Those two omissions are what turned Long-Term Capital's losses into its failure: a large holder cannot sell into a falling market at the prices on the screen, and lenders who were easy while the capital was there become exacting as it goes. A fund holding \$100 billion of emerging-market sovereign bonds would be, in that market, what Long-Term Capital was in the swap and futures markets, a holder whose selling is itself the price. Second, the resolution. The loss fell on wealthy investors and on partners who had put in their own money; the rescue was paid for by counterparties who each stood to lose more from a default than from what they contributed; and the fund could then be wound down, because nothing depended on its continuing. None of this is available to the TFIF. Its cushion is loans from treasuries, which expect them back; its bondholders rank ahead of the sponsors and have no reason to put in more; the only party that can recapitalise it in a crisis is the sponsors themselves; and it cannot be wound down without ending the payments to forests that are its purpose.

9.7 Conclusion

The five cases in this chapter differ in instrument, in scale and in what was bet on. What they share is a sequence, and it is worth setting out once, because the TFIF is at the beginning of that sequence. A public body, or in the last case a private one with a public body's credit standing, treated the cheapness of its own borrowing as an asset. It found a return in the markets that exceeded its cost of funds and took the difference as income. The income was earned for a period, sometimes a long one, and the success became the argument for continuing: Citron was

⁸⁹ Working Group report, pp. 12–13 (counterparties "seeking to apply possible liquidation values to mark-to-market valuations"; "further unfavorable market movements could have led to a default as soon as Wednesday, September 23"); GAO, Table I.1 (the loss of \$500 million on 21 September).

⁹⁰ Working Group report, pp. 13–14; GAO, Table I.1, p. 40; McDonough, 1 October 1998. GAO, p. 12, gives the regulators' estimate that each major counterparty stood to lose \$300 million to \$500 million in a default.

⁹¹ Fleming and Liu, Federal Reserve History: the fund "sold most of its remaining positions and returned the last of the group's \$3.6 billion investment by the end of 1999." The loss is the difference between \$4.8 billion at the start of 1998 and the roughly \$400 million implied by \$3.6 billion buying 90% of the fund.

re-elected on his record, Detroit's borrowing won an award, Sachsen LB drew 82% of its operating profit from Dublin, Long-Term Capital returned \$2.7 billion to investors it no longer needed. In each case the risk had been described in advance as small: no risk to principal in Orange County, "essentially AAA business" in Dublin, a risk "little more than that involved in depositing the funds in a savings bank" in Haugesund, a portfolio no riskier than "the S&P 500 index on an unleveraged basis" at Long-Term Capital. The reversal, when it came, was an event nobody in the story had chosen and everybody's models had discounted: the Federal Reserve's rate rises of 1994, Russia's default in 1998, the closing of the commercial-paper and structured-credit markets in the summer of 2007. The loss was then made permanent by the lenders. And the people who absorbed the loss were, in the public institution examples, people who had no knowledge of the arrangement: Detroit's retirees, Orange County's depositors and the users of its services, the residents of Bremanger and Narvik, the taxpayers of Saxony.

Every step has its counterpart in the TFIF, and the stories above have illustrated them: a spread assumed to hold for forty years (Detroit); a design that pays out each good year's surplus and keeps nothing for the bad ones (Orange County); a refinancing test that forces sales at the bottom (Norway); a spread whose whole source is the sponsors' credit support (Germany); a fund too large to sell what it holds without moving the price against itself (Long-Term Capital). What is different about the TFIF makes the sequence more likely to run, not less. Its scale exceeds every public case here. Its life is forty years, long enough to meet several of the events that ended the cases above within months of their starting. Nobody stands behind it: the Landesbanken had the state of Saxony, Long-Term Capital had fourteen counterparties with a reason to pay, Orange County's depositors had lawsuits, and the TFIF has only the sponsors themselves, who are the ones already exposed. And the residual claimant is not a class of creditors who can litigate but the forests, whose payment is last in the waterfall and first to be curtailed. That has a consequence which precedes any crisis. Chapter 7 argued that a payment for standing forest changes decisions about land only if it can be counted on. A forest country's finance minister who reads Chapter 8, or this chapter, will not count on steady payments from the TFFF, and the incentive the Facility exists to create is weakened before a single bond has been sold. It is for this reason that Chapter 3's principles insist that the conservation payment be stable and consistent; the cases here are the record of what happens when it is not.

The cases in this chapter were chosen because their records are comprehensive, not because they are unusual. Governments have been using their credit to earn a return in financial markets for as long as they have had credit, and the results have been consistent. In the quarter-century after 1815 the American states borrowed more than \$200 million to invest in banks and canals, and several of them did so on the explicit understanding that the investments, not taxes, would service the debt.⁹² Mississippi's method, which economic historians call the Mississippi model, was to issue state bonds to a bank in exchange for its shares and to require the bank, by its charter, to pay the interest and principal on the bonds out of the dividends on the state's shares:

⁹² John Joseph Wallis, Richard E. Sylla and Arthur Grinath III, "Sovereign Debt and Repudiation: The Emerging-Market Debt Crisis in the U.S. States, 1839–1843," NBER Working Paper 10753, September 2004, p. 1: states borrowed "more than \$200 million" in the quarter-century after 1815, "a level nearly twice as high as the debt of the federal government at its peak in the half-century between 1790–1840," a debt which "represented mostly the costs of the War of Independence and the War of 1812"; state debts outstanding in 1841 totalled \$198 million.

“to issue debt that the state never intended or expected to service with tax revenues.”⁹³ Pennsylvania’s was “to borrow, pay interest with the proceeds of more borrowing, and delay taxing until such time as it became absolutely necessary.”⁹⁴ Georgia and Alabama had already abolished their property taxes on the strength of the dividends from their bank stock.⁹⁵ In 1841 and 1842 eight states and the territory of Florida defaulted; five repudiated all or part of what they owed, and every repudiation involved bonds issued to banks. Mississippi never paid a coupon on the \$5 million of bonds it had issued to its Union Bank in 1838, and repudiated them in February 1842.⁹⁶

The instruments have changed and the idea has not. In 1987 West Virginia’s Consolidated Investment Fund, a pool of the state’s idle cash conceived “to earn high interest by putting idle money to work,” financed \$550 million of Treasury notes through reverse repurchase agreements and lost hundreds of millions of dollars when the bond market fell that spring.⁹⁷ In the same year as Orange County, Cuyahoga County, Ohio, lost about \$115 million in a pool that borrowed against the securities it held in order to buy more of them.⁹⁸ Between 1987 and 1989 the London Borough of Hammersmith and Fulham, with £390 million of borrowing and a budget of £44.6 million, entered 592 interest-rate swaps with a notional value of £6,052 million; the House of Lords found that the transactions “were undertaken in the hope that the burden of interest payable in respect of borrowings by the council would be mitigated by profits from swap contracts whereby the council successfully forecast movements in interest rates,” and that “the treasurer begins by exploiting the favourable rate of interest obtainable by a local authority on its borrowing from public sources.”⁹⁹ The council’s auditor put the loss at between £74 million

⁹³ Wallis, Sylla and Grinath, p. 7: “When the state invested in a bank, it did so by issuing bonds to the bank to purchase bank stock. The bank was required, by explicit terms in its state charter, to service both interest and principal on the state bonds from dividends on the state’s bank stock. Although the state pledged its faith and credit to the bonds, it never intended to pay either interest or principal on the debt.”

⁹⁴ Wallis, Sylla and Grinath, p. 7.

⁹⁵ Wallis, Sylla and Grinath, pp. 7–8: by 1835 Massachusetts, New York, Pennsylvania, Maryland, Georgia and Alabama collected no property tax; “Georgia and Alabama were enabled to eliminate their property taxes in the early 1830s because their investments in banks yielded increasing dividend revenues.”

⁹⁶ Wallis, Sylla and Grinath, pp. 1, 12 and 14. The Union Bank was to be capitalised at \$15.5 million; the state’s subscription was cut to \$5 million in February 1838; the bank failed to meet the interest in 1841; “the state never paid any interest on the bonds, and it formally repudiated them in February 1842.”

⁹⁷ *State v. Morgan Stanley & Co., Inc.*, 194 W. Va. 163, 459 S.E.2d 906 (1995) (Neely J.): the fund was “a state investment pool comprised of idle monies, usually operating funds, of the State and its agencies”; from 1985 the Treasurer’s investment division “launched a program of actively trading U.S. Government securities”; “ultimately \$550 million worth of these notes were financed by a reverse repurchase agreement and, as the market price of these securities declined, large losses were taken”; “in the spring of 1987, the government bond market took an unexpected and precipitous nosedive and our Consolidated Fund ... sustained enormous losses. The losses in our Consolidated Fund, amounting to hundreds of millions of dollars ...”. The court also records that “Treasurer Manchin was not an experienced financial executive.” The Treasurer was impeached by the House of Delegates in 1989.

⁹⁸ *State v. Gaul*, 117 Ohio App. 3d 839 (8th Dist. 1997): the Secured Assets Fund Earnings programme, established in 1991 for “public entities [to] place inactive funds,” in which “the county ‘sold’ existing bonds to other institutional investors, thereby obtaining cash, and agreed to repurchase the bonds at a specified date for a price slightly higher”; losses of about \$115 million by 1994 as rates rose. The county treasurer’s conviction for dereliction of duty was reversed on appeal.

⁹⁹ *Hazell v Hammersmith and Fulham London Borough Council* [1992] 2 AC 1 (HL), 24 January 1991, per Lord Templeman, at pp. 24 and 26–27: 592 swaps, £6,052 million notional in aggregate, 297 outstanding at 31 March 1989 with notional principal of £2,996 million; borrowing £390 million; budget £44.6 million. The council ran the transactions through a “capital market fund” it had never resolved to establish. Seventy-seven of the 450 principal local authorities in England and Wales had entered swaps by then, nearly all between 1987 and 1989.

and £293 million; the Lords held the contracts void, so that the loss fell largely on the banks rather than the ratepayers.¹⁰⁰ In 2006 five Wisconsin school districts put \$200 million into notes linked to synthetic collateralised debt obligations in order to fund their retirees' benefits, \$162.7 million of it borrowed; they were told it would take "15 Enrons" for the investment to fail, and lost the whole of it by 2010.¹⁰¹ Jefferson County, Alabama, borrowed \$3.2 billion to rebuild its sewers and, in 2002 and 2003, converted the debt into variable-rate paper paired with \$5.6 billion of interest-rate swaps in order to lower the interest cost; the structure failed in 2008, the county filed what was then the largest municipal bankruptcy in American history in 2011, and its residents' sewer bills, already four times what they had been in 1997, were set to rise a further 365% over forty years under the supervision of the bankruptcy court.¹⁰²

What these have in common with the cases above is not the instrument but the proposition: that a public body's cheap credit is an asset which can be put to work, that the difference between its borrowing rate and some higher return is income, and that the risk which explains the difference can be left out of the account. In every case the return was earned for a time, was budgeted as if it were permanent, and was gone before the bill arrived; and in every case the bill was paid by people who had not been asked whether they wished to take the bet. The TFIF asks the same proposition to be accepted by sovereign treasuries at a scale of \$25 billion, for forty years, on behalf of people with fewer alternatives than any of the residents, retirees and ratepayers above.

If tropical forests are worth \$25 billion of sponsor funding, and we think they are, they are worth funding in a way that does not depend on a leveraged bet on financial markets. The next chapter turns from the fund to the Facility: the institutions that must be built to decide who is paid and how much, what they cost, and whether the residual that the markets can be expected to leave is enough to carry them.

¹⁰⁰ [1992] 2 AC 1 at 27, quoting the auditor's affidavit of 30 May 1989: a loss of £74.3 million at the five-year swap rate of 9 February 1989, or £292.7 million at six-month LIBOR, before any further movement in rates. The House held that local authorities had no power to enter swap transactions, which were accordingly void.

¹⁰¹ SEC Litigation Release No. 22064, 10 August 2011 (*SEC v. Stifel, Nicolaus & Co. and David W. Noack*, E.D. Wis. No. 11-cv-755): the Kenosha, Kimberly, Waukesha, West Allis-West Milwaukee and Whitefish Bay districts "contributed \$37.3 million toward the \$200 million investment and borrowed the remaining \$162.7 million"; "by 2010, the school districts learned that the second and third investments were a complete loss and that the lender had seized all of the trusts' assets." Stifel and Noack admitted wrongdoing and paid \$24.5 million in 2016 (Litigation Release No. 23700, 7 December 2016), and the districts were eventually made whole by that and other settlements.

¹⁰² SEC, *In the Matter of J.P. Morgan Securities Inc.*, Securities Act Release No. 9078, 4 November 2009, ¶¶6–7, 45–46 (more than \$3 billion of auction, variable and fixed-rate bonds, eighteen swaps of \$5.6 billion notional; downgrades, failed auctions and termination); *In re Jefferson County*, 474 B.R. 228 (Bankr. N.D. Ala. 2012), p. 240 ("the County believed it could lower the interest on warrants by shifting from fixed rates to adjusting ones. Some of what failed was the structure the so-called experts sold to the county as being able to counteract the impact of an increase in interest rates") and p. 244 (average rates up over 300% since 1997; average bill \$63 a month); *Bennett v. Jefferson County*, 899 F.3d 1240 (11th Cir. 2018) (about \$3.2 billion of sewer debt at the filing of November 2011; rate increases of about 365% over forty years, which the bankruptcy court may impose if the county does not). The same bank's bankers had paid \$8.2 million to firms connected to county commissioners to win the business and built the cost into the swap rates; the commission president was sentenced to fifteen years (SEC Release 9078, ¶¶1–2, 13; *United States v. Langford*, 647 F.3d 1309 (11th Cir. 2011)).