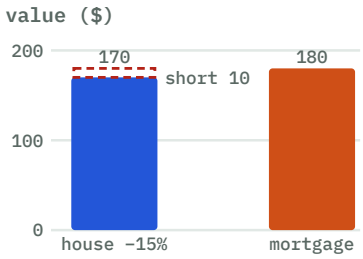
How did a house in Nevada sink a bank in Germany?

A house worth less than its mortgage, a bank's capital and leverage, the dip that wipes it out, leverage in good and bad years, securitization and the freeze between banks, 2006-2009 with Lehman and the bailout, the debate, checklist sign 7.

1 The house

Personal Finance, Lesson 10

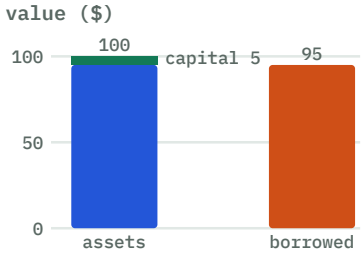
- **Mortgage** = a loan to buy a house, repaid over years · **equity** = the house's value beyond the loan
- Coralia (toy island): house `$200` = `$20` own + `$180` mortgage
- Prices −15% → `200 − 30 = $170` · loan still **$180** ⇒ **underwater** by `$10` (owing more on a mortgage than the house is worth)
- Family stops paying → bank gets a $170 house for a $180 loan · × millions of families → losses reach the banks
- Practice: house $300 = $30 own + $270 · −20% → `$240` · underwater `270 − 240 = $30` · `30 ÷ 300 = 10%` fall wipes out the $30



2 The bank

Personal Finance, Lesson 5

- **Capital** = the bank's own money = `assets − borrowed` · assets (loans + bonds it owns) 100, borrowed 95 → capital **$5**
- **Leverage** = `assets ÷ capital` = `100 ÷ 5 = 20` · dip that wipes out capital = `1 ÷ leverage` = **5%**
- −10% → `90 − 95 = −$5` ⇒ **insolvent** = owes more than it owns · leverage 50 (capital 2) → a **2%** dip is enough
- Practice: assets 200, borrowed 192 → capital `$8`, leverage `25` → `1 ÷ 25 = 4%` · −5% → `190 − 192 = −$2`



3 Both ways

why banks do it

- Same capital earns on more assets → good years: gains ↑ · bad years: losses ↑ the same way

$100 of assets	capital	assets +2%	assets −2%
Bank A (borrowed 90, leverage 10)	$10	$12 · +20%	$8
Bank B (borrowed 98, leverage 50)	$2	$4 · **+100%**	**$0**

4 Nevada → Germany

securitization, the freeze

- **Securitization** = bundling loans into bonds (bond = a share in a loan, bought and resold) sold to other investors · the bond pays only if the families pay
- **Rating agency** = a company that grades how safe a bond is → top grade, buyers relied on it (Behavioral Economics, Lesson 8: the crowd)
- German banks bought bonds made of US mortgages → families stop paying → bonds lose value **wherever they are held**
- **The freeze**: banks lend each other every night · nobody knows who holds bad bonds or how thin their capital is → lending stops = a **run between banks** (History, Lesson 3)
- Chain: house prices ↓ → families stop paying → mortgage bonds ↓ → thin capital gone → banks stop lending to each other

5 2006-2009

the real story

- US house prices (S&P Case-Shiller national index · Karl Case & Robert Shiller, US economists, Shiller Nobel 2013): peak **July 2006** → about **−27%** by Feb 2012 (index 100 → 73)
- **Subprime** = loans to borrowers with weak credit records → prices stop rising → cannot sell the house or take a new loan on it
- Germany: **IKB** (bank in Düsseldorf) rescued July 2007 · **Sachsen LB** (state bank of Saxony) Aug 2007 · German savings sent to the US to buy such bonds = a capital flow (money crossing a border to buy assets) (International Economics, Lesson 4)
- **Lehman Brothers** (US investment bank: traded bonds and shares, no savers' deposits; founded 1850) bankrupt (cannot pay its debts) **15 Sep 2008**, >$600 billion of assets, largest in US history → lending between banks froze
- **Bailout** = public money that saves a firm from failing · **TARP** (Troubled Asset Relief Program), law of 3 Oct 2008: up to **$700 billion** · US unemployment <5% early 2007 → ≈**10%** Oct 2009
- Practice: "it started with Lehman" → too far: losses from 2006, rescues in 2007; Lehman = the freeze

6 Debate, checklist

checklist sign 7

- Was the bailout right? **Rescue**: stops a run that hurts people who took no risk · **Do not rescue**: rewards the risk-takers, invites more risk next time · no verdict
- **Bubble checklist** · **Sign 1 · Bought to resell** · **Sign 2 · Money is a promise** · **Sign 3 · A run fills itself** · **Sign 4 · Printing to pay** · **Sign 5 · A supply shock cuts both ways** · **Sign 6 · Debt outlives the bubble** · **Sign 7 · Leverage turns a dip into a wipe-out**

Watch out: leverage = assets ÷ **capital**, not ÷ debt · wipe-out dip = `1 ÷ leverage` · the house falls, the **loan does not** · leverage multiplies **gains and losses** alike · Lehman was the freeze, not the start