# Instituciones Financieras

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Clase 3
UTDT Maestría en Finanzas

# Today

- Review
- Credit risk and capital (book value and market value)
- Global financial crisis 2008-2009
- Other determinants of the global crisis:
  - Financial innovation and credit rating agencies

# Credit risk

# Credit risk

- Credit risk is a measure of the **creditworthiness** of a borrower.
  - When calculating credit risk, lenders are estimating the (ex-ante) likelihood they will not recover all of their principal and interest when making a loan

- Ex-post measure: Non-performing loan ratio
  - When a borrower has not made regular payments for at least 90 days, the loan is considered a nonperforming loan, or NPL
  - The non-performing loan ratio is the ratio of the amount of nonperforming loans in a bank´s portfolio to the total amount of outstanding loans the bank holds

- Related to this risk: Concentration risk
  - The risk associated with any single exposure with the potential to produce large enough losses to threaten a bank´s core operations. It may arise in the form of single-name concentration or industry concentration

# Book value of capital, market value of capital, and credit risk

# Market value of capital and insolvency/credit risk

Balance sheet (market values)

| Assets | | Liabilities | |
|---|---|---|---|
| Long-term securities | $ 80 | Liabilities (short-term, floating-rate deposits) | $ 90 |
| Long-term loans | 20 | Net worth | 10 |
| | $100 | | $100 |

# Market value of capital and credit risk

**TABLE 20–2**
An FI's Market Value Balance Sheet after a Decline in the Value of Loans (in millions of dollars)

| Panel A: Market Value Balance Sheet after an $8 Million Decline in Loan Portfolio Value | | | |
|---|---|---|---|
| **Assets** | | **Liabilities** | |
| Long-term securities | $80 | Liabilities | $90 |
| Long-term loans | 12 | Net worth | 2 |
| | $92 | | $92 |
| **Panel B: Market Value Balance Sheet after a $12 Million Decline in Loan Portfolio Value** | | | |
| Long-term securities | $80 | Liabilities | $90 |
| Long-term loans | 8 | Net worth | −2 |
| | $88 | | $88 |

- In second case bank is insolvent. After liquidation depositors get $88 out of $90.

# Book value of capital and credit risk

**TABLE 20–4**
Book Value of an FI's Assets and Liabilities (in millions of dollars)

**Panel A: Beginning Book Value Balance Sheet**

| Assets | | Liabilities | |
|---|---|---|---|
| Long-term securities | $ 80 | Short-term liabilities | $ 90 |
| Long-term loans | 20 | Net worth | 10 |
| | $100 | | $100 |

**Panel B: Book Value Balance Sheet after Recording a Loan Loss Charge-Off of $3 Million**

| | | | |
|---|---|---|---|
| Long-term securities | $ 80 | Liabilities | $ 90 |
| Long-term loans | 17 | Equity (loss of 3 on loan loss reserve) | 7 |
| | $ 97 | | $ 97 |

- Of the $8 mill loss in market value the bank recognizes $3 mil (charged off against the loan loss reserve component of equity)

# Great Recession

# Global financial crisis 2008-2009

- This was a “capital shock” and a “liquidity shock” caused initially by credit losses in the subprime mortgage market

- Who contracted their supply of credit?
  - Banks.
    - Because of credit losses that initially stemmed from the subprime mortgage market
      - Destroyed the capital base of the banks
      - Some banks also had liquidity problems with interbank and loan sales markets freezing up

# The Mechanics of a Capital Shock

- Banks must meet regulatory capital requirements (e.g., Total Capital/Risk-Weighted Assets ≥ 8%)
- Banks must also meet "market capital requirements."
  - Banks have target capital requirements driven by reputation/credibility effects
- Credit losses deplete capital (i.e., stockholders equity)
- Banks must:

# The Mechanics of a Capital Shock

- Banks must meet regulatory capital requirements (e.g., Total Capital/Risk-Weighted Assets ≥ 8%)
- Banks must also meet "market capital requirements."
  - Banks have target capital requirements driven by reputation/credibility effects
- Credit losses deplete capital (i.e., stockholders equity)
- Banks must either:
  - Raise more equity (e.g., from public offerings, and TARP funds).
  - Reduce risk-weighted assets by contracting lending

# What is the problem?

- Look at a typical bank balance sheet.
- Deposits, short-term debt, long-term debt and equity fund
- Loans (cash, and investments in securities).
  - Include mortgages and mortgage-related securities.
- Roughly $23 trillion in assets at U.S. Fin'l Institutions.

| | | | |
|---|---|---|---|
| Loans | 100 | Deposits | 70 |
| | | Short-term Debt | 10 |
| | | Long-term Debt | 10 |
| | | Equity | 10 |

# What is the problem?

- Mortgage (and other?) losses are substantial at financial institutions.
- Losses are meaningful relative to equity bases of levered institutions.
- Restoration requires rebuilding capital base of these institutions.

| | | | | | |
|---|---|---|---|---|---|
| Loans | 100 | 92 | Deposits | 70 | |
| | | | Short-term Debt | 10 | |
| | | | Long-term Debt | 10 | |
| | | | Equity | 10 | 2 |

- Before capital ratio 10%, afterwards 2,17% (=2/92*100)

# What is the problem?

- When equity capital is low, financial institutions can:
  - Sell loans.
  - Raise equity.
- They usually sell assets first.
  - When equity goes down, bank becomes overleveraged.
  - Selling loans (at book value) and paying down debt reduces leverage.

- Sell loans of 50 for 50.
- Still highly leveraged but:
  - less highly leveraged. 4% equity (not 2%).
  - have substantially reduced lending. 92 to 42

| | | | | | | |
|---|---|---|---|---|---|---|
| Loans | 100 | 92 | 42 | Deposits | 70 | 30 |
| | | | | Short-term Debt | 10 | 5 |
| | | | | Long-term Debt | 10 | 5 |
| | | | | Equity | 10 | 2? |

- But:
  - Hard to sell  loans at book value
  - Selling loans depresses prices of other loans and assets
  - Selling loans (deleveraging) reduces bank lending

# Liquidity shock

- When lenders and counterparties question bank solvency, they stop lending and transacting with it
- This is worse if bank relies on short term debt (e.g., Lehman Brothers)
- You can have a bank run even if the institution is solvent (or would be solvent under normal conditions)

# Other factors that led to the 2008/2009 crisis

- Accomodative monetary policy
  - Very low interest rates can increase risk taking in search for higher yields
  - E.g., banks lent to subprime borrowers and had large exposures to the real estate sector
- Financial innovation
  - Originate to securitize (pool and package loans and issue securities against them)
  - Reduce FI incentives to adequately screen borrowers
- Rating agencies
  - Generated ratings that were too high on structured finance products

# Global financial crisis

Financial innovation and rating agencies

# Introduction: Credit Rating Agencies

- What is a credit rating?
  - An opinion of the general creditworthiness (probability of default) of either an issuer or one of the specific issues made by the issuer
    - Issuer rating: rating of IBM or a sovereign country (Brazil)
    - Issue rating: IBM's bond with a 6.875 coupon and maturity 2031
- No opinion on whether debt instrument should be bought or sold

# Introduction: Credit Rating Agencies

- Different securities from the same issuer can have different ratings if seniority is different (e.g., secured debt will have higher rating than unsecured debt)
- It is not uncommon for different ratings to be assigned by rating agencies to the same issuer/issue.

# Why do we need them?

- Information asymmetries between borrowers and lenders
  - Issuers (borrowers) have superior information
- Efficiency
    - Costly and duplicative for purchasers of financial instruments to do their own research
    - Rapid dissemination of information

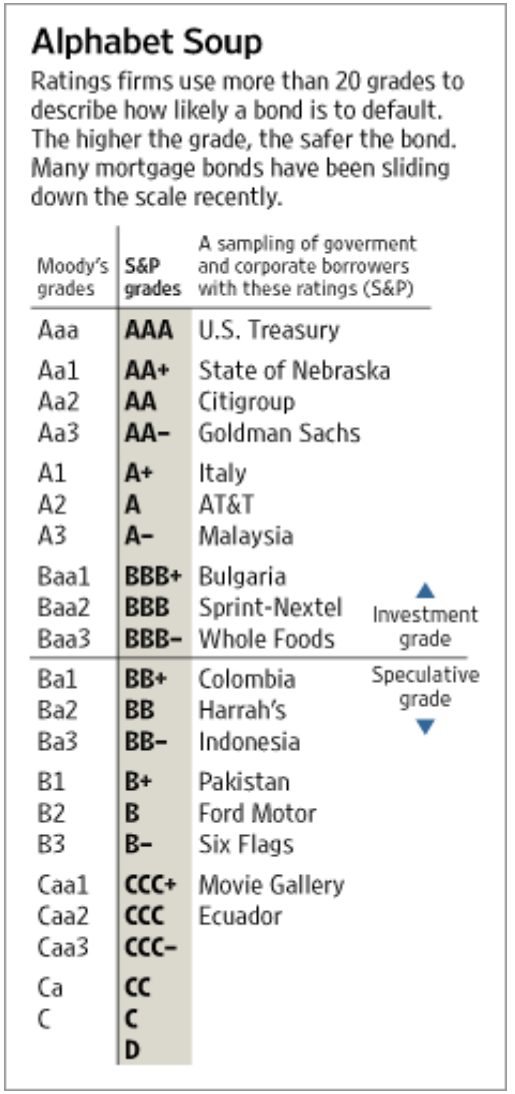
**“There are two superpowers in the world today in my opinion. There's the United States and there's Moody's Bond Rating Service.”**

**Thomas Friedman (NYT), Feb. 13, 1996**

# Credit Rating Business

Credit rating agencies sell

- Ratings (or "opinions")
  - not statements of facts and certainly not investment advice
- Advice to rated firms
  - Credit Rating Advisory Services



**Alphabet Soup**

Ratings firms use more than 20 grades to describe how likely a bond is to default. The higher the grade, the safer the bond. Many mortgage bonds have been sliding down the scale recently.

| Moody's grades | S&P grades | A sampling of goverment and corporate borrowers with these ratings (S&P) | |
|---|---|---|---|
| Aaa | **AAA** | U.S. Treasury | |
| Aa1 | **AA+** | State of Nebraska | |
| Aa2 | **AA** | Citigroup | |
| Aa3 | **AA–** | Goldman Sachs | |
| A1 | **A+** | Italy | |
| A2 | **A** | AT&T | |
| A3 | **A–** | Malaysia | |
| Baa1 | **BBB+** | Bulgaria | ▲ |
| Baa2 | **BBB** | Sprint-Nextel | Investment grade |
| Baa3 | **BBB–** | Whole Foods | |
| Ba1 | **BB+** | Colombia | Speculative grade |
| Ba2 | **BB** | Harrah's | |
| Ba3 | **BB–** | Indonesia | ▼ |
| B1 | **B+** | Pakistan | |
| B2 | **B** | Ford Motor | |
| B3 | **B–** | Six Flags | |
| Caa1 | **CCC+** | Movie Gallery | |
| Caa2 | **CCC** | Ecuador | |
| Caa3 | **CCC–** | | |
| Ca | **CC** | | |
| C | **C** | | |
| | **D** | | |

# Business Model

Credit agencies are paid

- By investors prior to 1970s
- By rated issuers now

# Issuers pay

– Provides benefits via rapid dissemination of ratings

BUT:

– Strong potential conflict of interest
– Power to suppress unwanted ratings

# So, who should pay?

- Investors?
  - Free-riding problem

"go back to their roots and have investors pay for the ratings"

Sen. Schumer (D-NY), Sept. 26, 2007

# Conflicts of Interest

- Inherent conflicts under the "issuers-pay" model
  - Issuers only care about high rating - accuracy becomes less relevant
  - Rating and advisory business (conflict of interest)

"**Credit rating agencies are playing both coach and referee in giving advice to issuers of debt**"

Sen. Robert Menendez, D-NJ, Sept. 26, 2007

# Conflicts of Interest

- Traditional corporate bond rating business

  - ❖Large base of clientele
  - ❖Lower profit margin
  - ❖Reputation risk

# Deepened Conflicts of Interest

- Structured finance business

  - ❖Clientele: A handful of banks
  - ❖More complex products
  - ❖Excessively high profit margin
  - ❖Rating shopping
  - ❖Lower reputation risk

# In the aftermath of the subprime crisis, rating agencies were accused of

- assigned too favorable ratings, especially for subprime residential mortgage-backed securities (RMBS)
- did not maintain appropriate independence from the issuers and underwriters of those securities
- failed to adjust those ratings sooner as the performance of the underlying assets deteriorated

**Internal email among S&P employees in December 2006:**
**…Rating agencies continue to create an even bigger monster – the CDO market. Let's hope we are all wealthy and retired by the time this house of cards falters.**

# Subprime crisis

- Based on: Benmelech, E., and Dlugosz, J., The Credit Rating Crisis, *NBER Working Paper* No. w15045, 2009.

# Subprime crisis

- Mistakes by credit rating agencies (CRAs) are often cited as one of the causes of the recent financial crisis, which began with a surge in subprime mortgage defaults from 2006-08
- Prior to the crisis, 80- 95% of a typical subprime or Alt-A mortgage-backed-securities (MBS) deal was assigned the highest possible triple-A rating, making these securities attractive to a wide range of domestic and foreign investors.
- Reflecting high mortgage defaults, however, many MBS originally rated investment-grade traded significantly below par after the crisis, and have experienced large rating downgrades and even losses.

# Definitions I

- An Alt-A mortgage, short for Alternative A-paper, is a type of U.S. mortgage that is considered riskier than A-paper, or "prime", and less risky than "subprime," the riskiest category.

- Alt-A interest rates, which are determined by credit risk, therefore tend to be between those of prime and subprime home loans.

- Typically Alt-A mortgages are characterized by borrowers with less than full documentation, lower credit scores, higher loan-to-values.

# Definitions II

- **“Securitization”** is a broad term that encompasses several kinds of structures in which loans, mortgages, or other debt instruments are packaged into securities.

- There are two basic types of securitization:

  1. pass-through securitizations
  2. tranched securitizations

# Some Definitions

- In a **pass-through securitization,** the issuer pools a set of assets and issues securities to investors backed by the cash flows. A single type of security is issued so that each investor holds a proportional claim on the underlying assets

- **Tranched securitizations** are more complex. After pooling a set of assets, the issuer creates several different classes of securities, or tranches, with prioritized claims on the collateral. In a tranched deal some investors hold claims more senior to others' claims.

# Tranched Securitization

- Individual securities are often split into **tranches**, or categorized into varying degrees of subordination.

- Each tranche has a different level of credit protection or risk exposure than another: there is generally a senior (“A”) class of securities and one or more junior subordinated (“B,” “C,” etc.) classes that function as protective layers for the “A” class.

- The senior classes have first claim on the cash that the SPV (special purpose vehicle) receives, and the more junior classes only start receiving repayment after the more senior classes have been repaid.

# Tranched Securitization

- In the event that the underlying asset pool becomes insufficient to make payments on the securities (e.g. when loans default within a portfolio of loan claims), the loss is absorbed first by the subordinated tranches, and the upper-level tranches remain unaffected until the losses exceed the entire amount of the subordinated tranches.

- The **senior securities are typically AAA** rated, signifying a lower risk, while the lower-credit quality subordinated classes receive a lower credit rating, signifying a higher risk

**Table 3**
Structured Finance Upgrades and Downgrades

| | | A. Total Upgrades and Downgrades | | | | | |
|---|---|---|---|---|---|---|---|
| | | Downgrade | | Upgrade | | Withdrawn Rating | |
| Cohort Formed | Rated Tranches | No. | Average Change[a] | No. | Average Change[a] | No. | % |
| 1/1/1990 | 2,825 | 85 | −1.2 | … | .0 | 48 | 1.7 |
| 1/1/1991 | 3,993 | 155 | −1.2 | … | .0 | 124 | 3.1 |
| 1/1/1992 | 5,571 | 87 | −1.8 | 122 | 2.1 | 828 | 14.9 |
| 1/1/1993 | 7,290 | 149 | −1.5 | 131 | 1.5 | 1,336 | 18.3 |
| 1/1/1994 | 9,320 | 192 | −2.8 | 237 | 1.9 | 1,038 | 11.1 |
| 1/1/1995 | 11,083 | 148 | −2.0 | 352 | 1.7 | 637 | 5.7 |
| 1/1/1996 | 13,403 | 175 | −2.7 | 272 | 1.9 | 1,065 | 7.9 |
| 1/1/1997 | 15,298 | 49 | −1.5 | 439 | 1.5 | 1,100 | 7.2 |
| 1/1/1998 | 18,214 | 447 | −2.4 | 366 | 2.0 | 1,924 | 10.6 |
| 1/1/1999 | 20,419 | 330 | −3.6 | 380 | 2.2 | 2,169 | 10.6 |
| 1/1/2000 | 23,358 | 463 | −1.5 | 642 | 2.3 | 2,235 | 9.6 |
| 1/1/2001 | 26,905 | 476 | −2.5 | 557 | 1.7 | 3,084 | 11.5 |
| 1/1/2002 | 31,901 | 1,847 | −2.9 | 720 | 1.8 | 4,598 | 14.4 |
| 1/1/2003 | 38,147 | 2,515 | −3.1 | 699 | 2.5 | 7,920 | 20.8 |
| 1/1/2004 | 43,476 | 1,798 | −3.6 | 1,216 | 2.4 | 6,953 | 16.0 |
| 1/1/2005 | 52,843 | 874 | −2.5 | 2,202 | 2.2 | 6,878 | 13.0 |
| 1/1/2006 | 71,462 | 986 | −2.5 | 2,748 | 2.3 | 7,085 | 9.9 |
| 1/1/2007 | 94,127 | 8,109 | −4.7 | 2,990 | 1.9 | 6,692 | 7.1 |
| 1/1/2008[b] | 442,908 | 36,880 | −5.6 | 1,269 | 2.4 | 6,380 | 1.4 |

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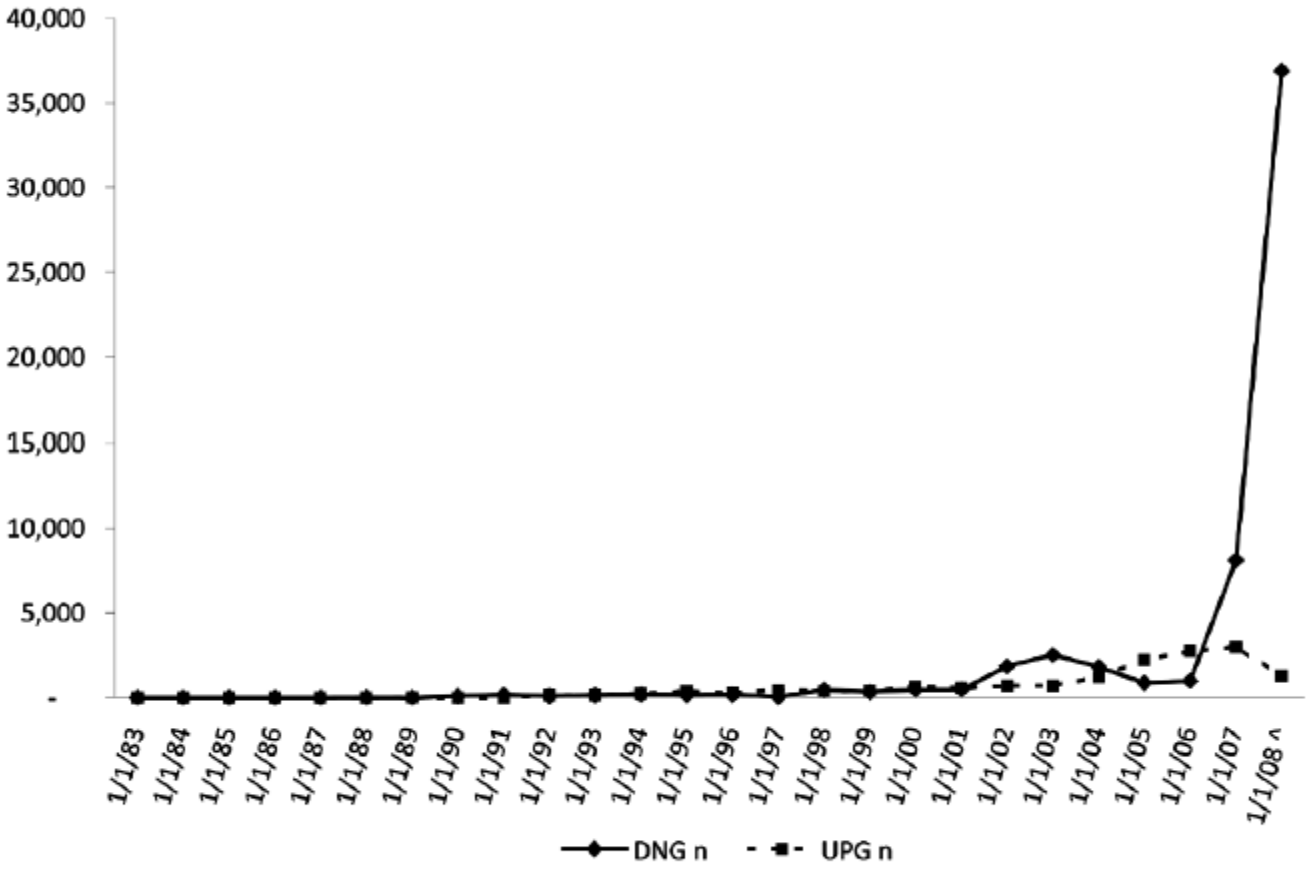


Fig. 2. Number of downgrades versus upgrades of structured finance products

# Comments I

- Downgrades of structured finance products spiked in 2007. Whereas the total number of tranches outstanding increased from 71,462 to 94,127, or by 31.7%, the number of downgrades skyrocketed eightfold **from 986 to 8,109**.

- There were **36,880 downgrades** of structured finance tranches in the first three quarters of 2008, overshadowing the cumulative total number of downgrades in 2005–7.

# Comments II

- Downgrades were not only more common but also more severe in 2007 and 2008. The average downgrade was **−4.7 in 2007 and −5.6** in 2008, compared to −2.5 in both 2005 and 2006.

- Meanwhile, upgrades were less frequent and smaller in magnitude on average. There were 2,990 upgrades in 2007 and 1,269 in the first three quarters of 2008. The average upgrade in each year was 1.9 and 2.4 notches, respectively

**Table 4**
Corporate Bonds Upgrades and Downgrades

| | | A. Total Upgrades and Downgrades | | | | | |
|---|---|---|---|---|---|---|---|
| | | Downgrade | | Upgrade | | Withdrawn Rating | |
| Cohort Formed | Rated Bonds | No. | Average Change[a] | No. | Average Change[a] | No. | % |
| 1/1/1990 | 3,016 | 349 | −1.5 | 287 | 1.3 | 321 | 10.6 |
| 1/1/1991 | 3,115 | 343 | −1.4 | 231 | 1.4 | 326 | 10.5 |
| 1/1/1992 | 3,582 | 582 | −1.4 | 141 | 1.4 | 621 | 17.3 |
| 1/1/1993 | 3,899 | 465 | −1.3 | 142 | 1.6 | 772 | 19.8 |
| 1/1/1994 | 4,229 | 398 | −1.3 | 264 | 1.4 | 435 | 10.3 |
| 1/1/1995 | 4,599 | 342 | −1.3 | 426 | 1.3 | 445 | 9.7 |
| 1/1/1996 | 5,124 | 441 | −1.3 | 457 | 1.3 | 520 | 10.1 |
| 1/1/1997 | 6,727 | 732 | −1.2 | 522 | 1.3 | 754 | 11.2 |
| 1/1/1998 | 8,514 | 1,524 | −1.6 | 577 | 1.3 | 985 | 11.6 |
| 1/1/1999 | 10,623 | 2,137 | −1.5 | 800 | 1.5 | 1,117 | 10.5 |
| 1/1/2000 | 11,867 | 1,752 | −1.6 | 898 | 1.6 | 1,398 | 11.8 |
| 1/1/2001 | 12,437 | 3,190 | −1.7 | 807 | 1.5 | 1,989 | 16.0 |
| 1/1/2002 | 12,885 | 5,027 | −1.8 | 431 | 1.5 | 2,068 | 16.0 |
| 1/1/2003 | 13,056 | 2,453 | −1.6 | 611 | 1.4 | 2,579 | 19.8 |
| 1/1/2004 | 13,523 | 1,233 | −1.3 | 1,540 | 1.5 | 2,425 | 17.9 |
| 1/1/2005 | 13,305 | 1,424 | −1.5 | 1,626 | 1.4 | 2,425 | 18.2 |
| 1/1/2006 | 12,727 | 2,107 | −1.3 | 1,687 | 1.2 | 2,082 | 16.4 |
| 1/1/2007 | 12,586 | 1,539 | −1.4 | 1,869 | 1.2 | 1,851 | 14.7 |
| 1/1/2008[b] | 12,753 | 1,482 | −2.2 | 367 | 1.3 | 1,517 | 11.9 |

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| 1/1/2003 | 13,056 | 2,453 | −1.6 | 611 | 1.4 | 2,579 | 19.8 |
| 1/1/2004 | 13,523 | 1,233 | −1.3 | 1,540 | 1.5 | 2,425 | 17.9 |
| 1/1/2005 | 13,305 | 1,424 | −1.5 | 1,626 | 1.4 | 2,425 | 18.2 |
| 1/1/2006 | 12,727 | 2,107 | −1.3 | 1,687 | 1.2 | 2,082 | 16.4 |
| 1/1/2007 | 12,586 | 1,539 | −1.4 | 1,869 | 1.2 | 1,851 | 14.7 |
| 1/1/2008[b] | 12,753 | 1,482 | −2.2 | 367 | 1.3 | 1,517 | 11.9 |

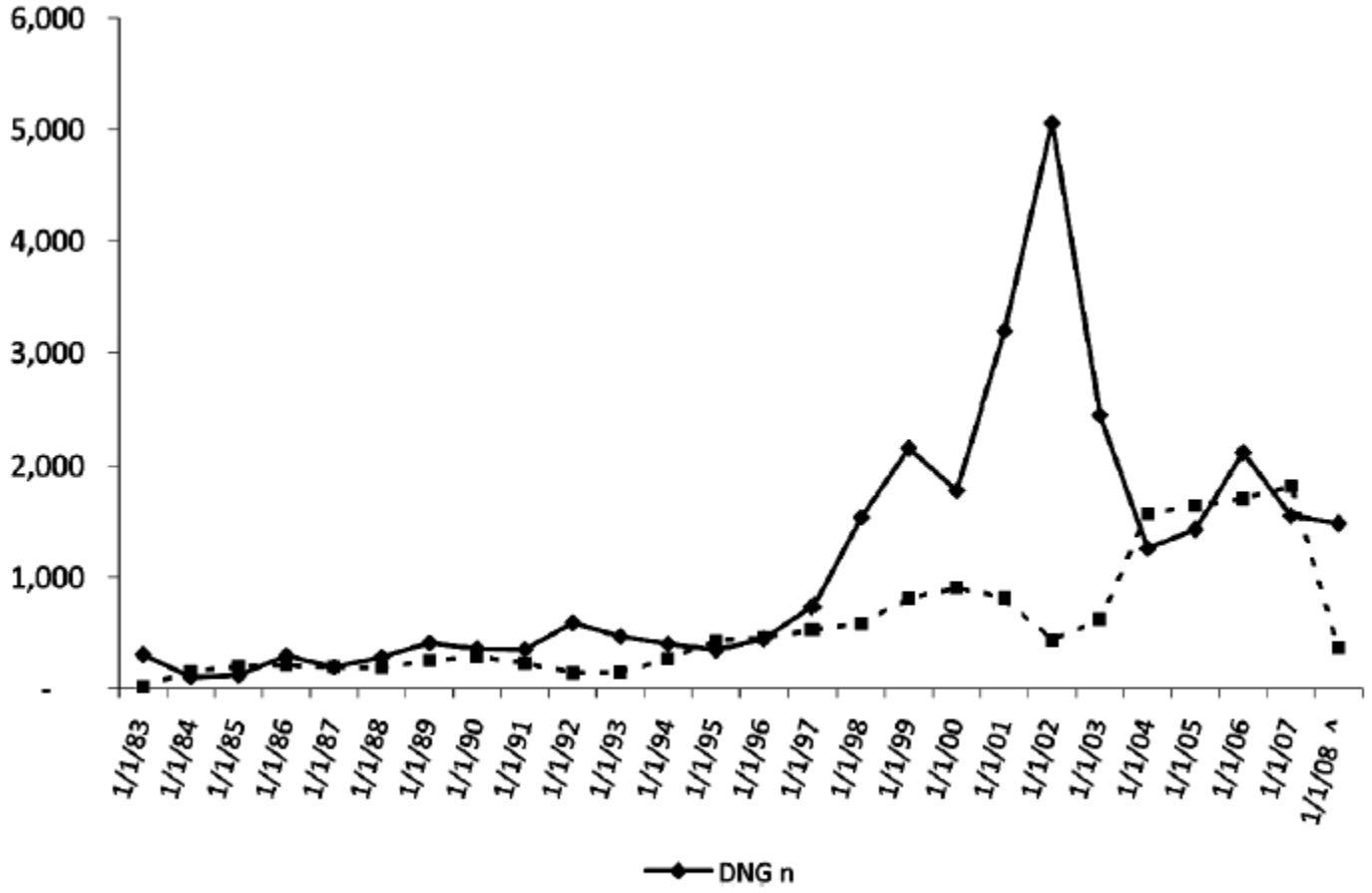


Fig. 3. Number of downgrades versus upgrades of corporate bonds

# Comments III

- Corporate bonds experienced a significant credit deterioration in 2001 and 2002, mainly because of the bankruptcy wave of 2001 and a slowing economy during that time.

- Nearly half of the downgrades in 2002 involved technology, telecommunications, and energy trading firms.

- Even in the midst of the recession in 2000–2001 when more than 30% of the outstanding bonds were downgraded at least once, the average downgrade was only −1.8 notches.

# Comments IV

- Taken together, these results suggest that corporate bond ratings were well calibrated to the underlying economic risk of the issuer.

- In contrast, the average downgrades of structured finance products in 2007 and during the first 3 months of 2008 were −4.7 and −5.8 notches, respectively (fig. 5), suggesting that the initial distribution of structured finance credit ratings was inflated

# What type of structured product suffered the most severe downgrade?

# Comments V

- Another unique aspect of the downgrade wave of structured finance products in 2007 and 2008 is its concentration among AAA-rated tranches.

- Many of the tranches downgraded in 2007 and 2008 were highly rated; 11,327 (31%) of all downgrade actions in the first three quarters of 2008 involved AAA rated tranches.

# Comments VI

- In contrast, in the corporate bond market, very few AAA-rated corporate bonds were downgraded between 1984 and 2008.

- The lack of downgrades of AAA securities in the bond market is particularly pronounced during the 2001–2 recession and is consistent with the fairly small magnitude of downgrades in this sector and the fact that only a small share of corporate bonds are rated AAA.

# Why did the credit rating collapse?

**Table 10**
Number of Raters

| | Raters | | | |
|---|---|---|---|---|
| | 0 | 1 | 2 | 3 |
| Period: | | | | |
| Pre-2004 | 603 | 133 | 550 | 535 |
| | (33.11%) | (7.30%) | (30.20%) | (29.38%) |
| 2004 | 374 | 439 | 1,993 | 1,186 |
| | (9.37%) | (11.00%) | (49.92%) | (29.71%) |
| 2005 | 547 | 778 | 5,363 | 2,537 |
| | (5.93%) | (8.43%) | (58.14%) | (27.50%) |
| 2006 | 573 | 392 | 7,060 | 2,786 |
| | (5.30%) | (3.63%) | (65.30%) | (27.77%) |
| 2007 | 171 | 94 | 2,478 | 845 |
| | (4.76%) | (2.62%) | (69.07%) | (23.54%) |
| Entire period | 2,268 | 1,836 | 17,444 | 7,889 |
| | (7.70%) | (6.24%) | (59.26%) | (26.80%) |
| Security type: | | | | |
| CMBS | 10 | 16 | 1,116 | 257 |
| | (.71%) | (1.14%) | (79.77%) | (18.37%) |
| RMBS | 463 | 1,371 | 6,768 | 1,065 |
| | (4.79%) | (14.18%) | (70.01%) | (11.02%) |
| Home equity | 346 | 406 | 6,997 | 5,983 |
| | (2.52%) | (2.96%) | (50.95%) | (43.57%) |
| CDO | 91 | 35 | 2,909 | 723 |
| | (2.42%) | (.93%) | (77.41%) | (19.24%) |

Note: CDO = collateralized debt obligation; CMBS = commercial mortgage-backed securities; RMBS = residential mortgage-backed securities.

**Table 11**
Most Common Raters

| | A. Securities Rated by One Agency Only | | | |
|---|---|---|---|---|
| | Fitch | Moody's | Standard & Poor's | Total |
| Pre-2004 | 20 | 21 | 92 | 133 |
| | (15.04%) | (15.79%) | (69.17%) | (100.00%) |
| 2004 | 66 | 32 | 341 | 439 |
| | (15.03%) | (7.29%) | (77.68%) | (100.00%) |
| 2005 | 97 | 46 | 635 | 778 |
| | (12.47%) | (5.91%) | (81.62%) | (100.00%) |
| 2006 | 162 | 56 | 174 | 392 |
| | (41.33%) | (14.29%) | (44.39%) | (100.0%) |
| 2007 | 29 | 27 | 38 | 94 |
| | (30.85%) | (28.72%) | (40.43%) | (100.00%) |
| Entire period | 374 | 182 | 1,280 | 1,836 |
| | (20.37%) | (9.91%) | (69.72%) | (100.00%) |

| | B. Securities Rated by Two Agencies | | | |
|---|---|---|---|---|
| | Standard & Poor's and Moody's | Standard & Poor's and Fitch | Moody's and Fitch | Total |
| Pre-2004 | 402 | 86 | 62 | 550 |
| | (73.09%) | (15.64%) | (11.27%) | (100.00%) |
| 2004 | 1,695 | 225 | 73 | 1,993 |
| | (85.05%) | (11.29%) | (3.66%) | (100.00%) |
| 2005 | 4,413 | 566 | 384 | 5,363 |
| | (82.29%) | (10.55%) | (7.16%) | (100.00%) |
| 2006 | 6,433 | 313 | 314 | 7,060 |
| | (92.12%) | (4.43%) | (4.45%) | (100.00%) |
| 2007 | 2,323 | 75 | 80 | 2,478 |
| | (93.71%) | (3.03%) | (3.23%) | (100.00%) |
| Entire period | 15,266 | 1,265 | 913 | 17,444 |
| | (87.51%) | (7.25%) | (5.23%) | (100.00%) |

# Rating Shopping

- The issuers accept only one rating from the agency that provides the most favorable judgment

- If rating shopping took place we should expect that securities rated by only one agency were more likely to be downgraded

# Probability of downgrade and number of raters

$$\Pr(\text{downgrade}_{i,\text{ as of January 2008}} = 1)$$

$$= \Phi(\mathbf{Raters}_{i,\ \mathbf{issue\ date}}\beta + \mathbf{Vintage}_i\Gamma + \mathbf{Type}_i\theta)$$

where $\Phi(\cdot)$ is the standard normal cumulative distribution function, $\mathbf{Raters}_{i,t=\text{issue}}$ is a vector that includes the number of raters or dummies for the identity of the raters, $\mathbf{Vintage}_i$ is a vector of vintage fixed effects, and $\mathbf{Type}_i$ is a vector of security-type fixed effects. We report the results from estimating different variants of regression (1) in table 13. We report regressions' marginal effects, and standard errors are clustered at the security-type level (in parentheses).

**Table 13**
Rating Shopping: Probit Regression Models for Probability of a Downgrade

| Dependent Variable | Pr(Downgrade) | | | | Rating Change | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| No. raters | | | .045*** | .086*** | | | .132 |
| | | | (.004) | (.007) | | | (.503) |
| One rater | .061** | .075** | | | −2.716*** | −1.808*** | |
| | (.030) | (.043) | | | (.793) | (.727) | |
| Two raters | −.005 | | | | −.909*** | | |
| | (.010) | | | | (.201) | | |
| Three raters | | .027*** | | | | .909*** | |
| | | (.009) | | | | (.201) | |
| Standard & Poor's only | | | .169*** | .322*** | | | −2.579*** |
| | | | (.049) | (.034) | | | (.300) |
| Moody's only | | | .084** | .223*** | | | −1.937* |
| | | | (.049) | (.070) | | | (1.011) |
| Fitch only | | | .093 | .240*** | | | −2.043*** |
| | | | (.073) | (.056) | | | (.861) |
| Standard & Poor's and Moody's | | | | .061*** | | | −.828 |
| | | | | (.016) | | | (.534) |
| Moody's and Fitch | | | | .046* | | | −.692*** |
| | | | | (.029) | | | (.151) |
| Fixed effects: | | | | | | | |
| Vintage | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Security type | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Estimation | Probit | Probit | Probit | Probit | OLS | OLS | OLS |
| Observations | 28,238 | 28,238 | 28,238 | 28,238 | 4,904 | 4,904 | 4,904 |
| Pseudo $R^2$ | .12 | .12 | .12 | .13 | .15 | .15 | .15 |

Note: OLS = ordinary least squares. Standard errors in parentheses.
*Significant at 10%.
**Significant at 5%.
***Significant at 1%.

**Table 13**
Rating Shopping: Probit Regression Models for Probability of a Downgrade

| Dependent Variable | Pr(Downgrade) | | | | Rating Change | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| No. raters | | | .045*** | .086*** | | | .132 |
| | | | (.004) | (.007) | | | (.503) |
| One rater | .061** | .075** | | | −2.716*** | −1.808*** | |
| | (.030) | (.043) | | | (.793) | (.727) | |
| Two raters | −.005 | | | | −.909*** | | |
| | (.010) | | | | (.201) | | |
| Three raters | | .027*** | | | | .909*** | |
| | | (.009) | | | | (.201) | |
| Standard & Poor's only | | | .169*** | .322*** | | | −2.579*** |
| | | | (.049) | (.034) | | | (.300) |
| Moody's only | | | .084** | .223*** | | | −1.937* |
| | | | (.049) | (.070) | | | (1.011) |
| Fitch only | | | .093 | .240*** | | | −2.043*** |
| | | | (.073) | (.056) | | | (.861) |
| Standard & Poor's and Moody's | | | | .061*** | | | −.828 |
| | | | | (.016) | | | (.534) |
| Moody's and Fitch | | | | .046* | | | −.692*** |
| | | | | (.029) | | | (.151) |
| Fixed effects: | | | | | | | |
| Vintage | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Security type | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Estimation | Probit | Probit | Probit | Probit | OLS | OLS | OLS |
| Observations | 28,238 | 28,238 | 28,238 | 28,238 | 4,904 | 4,904 | 4,904 |
| Pseudo $R^2$ | .12 | .12 | .12 | .13 | .15 | .15 | .15 |

Note: OLS = ordinary least squares. Standard errors in parentheses.
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**Table 13**
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|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| No. raters | | | .045*** | .086*** | | | .132 |
| | | | (.004) | (.007) | | | (.503) |
| One rater | .061** | .075** | | | −2.716*** | −1.808*** | |
| | (.030) | (.043) | | | (.793) | (.727) | |
| Two raters | −.005 | | | | −.909*** | | |
| | (.010) | | | | (.201) | | |
| Three raters | | .027*** | | | | .909*** | |
| | | (.009) | | | | (.201) | |
| Standard & Poor's only | | | .169*** | .322*** | | | −2.579*** |
| | | | (.049) | (.034) | | | (.300) |
| Moody's only | | | .084** | .223*** | | | −1.937* |
| | | | (.049) | (.070) | | | (1.011) |
| Fitch only | | | .093 | .240*** | | | −2.043*** |
| | | | (.073) | (.056) | | | (.861) |
| Standard & Poor's and Moody's | | | | .061*** | | | −.828 |
| | | | | (.016) | | | (.534) |
| Moody's and Fitch | | | | .046* | | | −.692*** |
| | | | | (.029) | | | (.151) |
| Fixed effects: | | | | | | | |
| Vintage | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Security type | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Estimation | Probit | Probit | Probit | Probit | OLS | OLS | OLS |
| Observations | 28,238 | 28,238 | 28,238 | 28,238 | 4,904 | 4,904 | 4,904 |
| Pseudo $R^2$ | .12 | .12 | .12 | .13 | .15 | .15 | .15 |

Note: OLS = ordinary least squares. Standard errors in parentheses.
*Significant at 10%.
**Significant at 5%.
***Significant at 1%.

# Final comments

- The coefficient on the one-rater dummy suggests that securities rated by one agency are 6.1 percentage points more likely to be downgraded. The effect is significant at the 5% level, while the marginal effect of the two-raters dummy is close to zero and not statistically significant.

- The results in table 13 suggest that S&P's ratings may have been inflated and that rating shopping may have played a role in the collapse of the structured finance market.

- Industry experts questioned the S&P rating model and some of its underlying assumptions. This seems to be confirmed by the data